5.3 Ventilation Factors

An alternative to the Holzworth technique is to calculate a "ventilation factor" defined as the product of the mixing height (H) and the average wind speed (u) in the mixed layer. This factor has the advantage of including both parameters in a physically meaningful manner for all stations. The factor represents the denominator of a standard box model in a dispersion computation. Low wind speeds and low mixing heights lead to small ventilation factors which translate into large pollution potential.

The ventilation factors were computed for the 17 sounding locations used previously for the Holzworth calculations. 50th percentile and 10 percentile values were computed by months and seasons. These values are given in the Appendix.

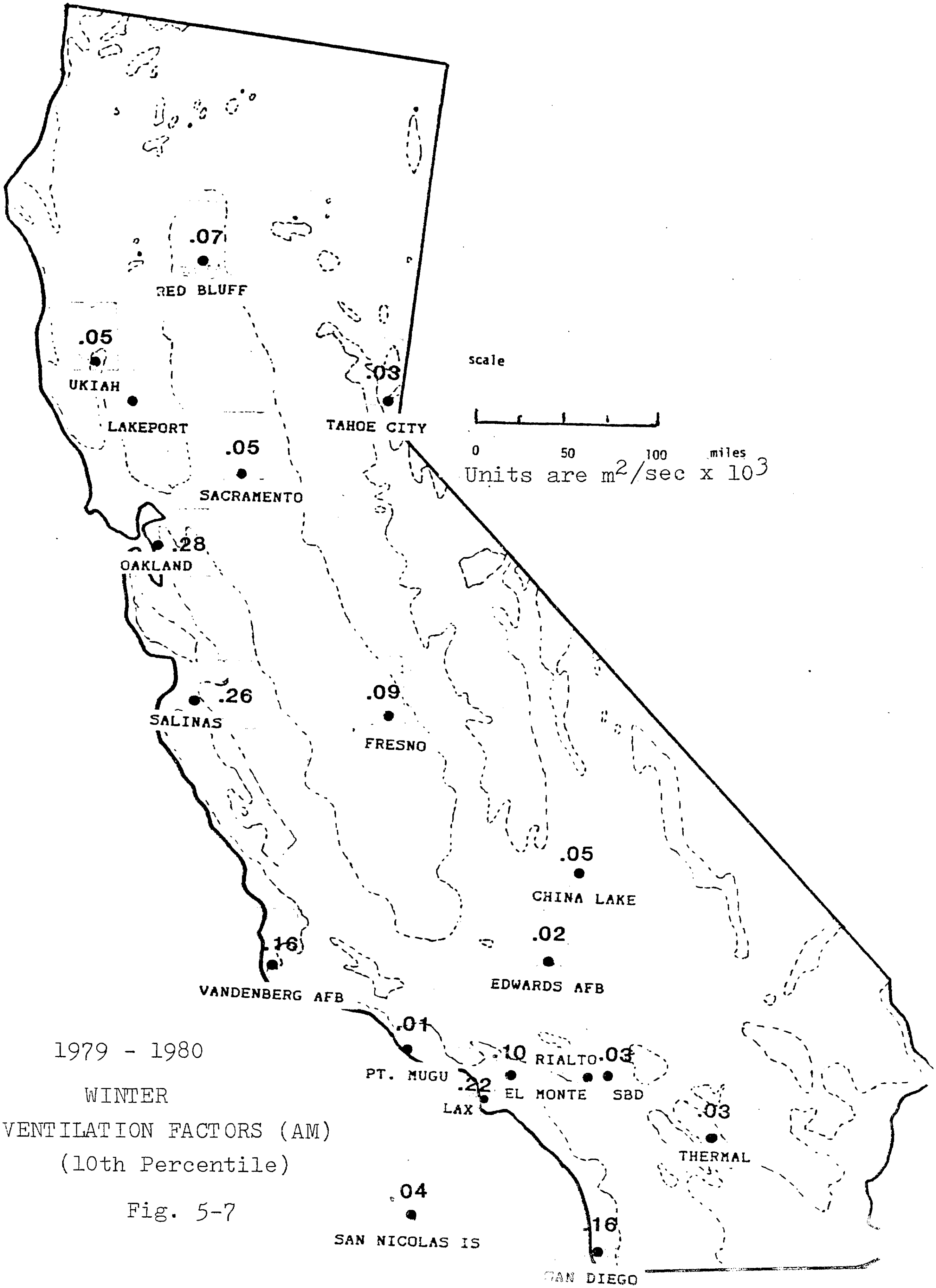
Tenth percentile values for morning and afternoon for the four seasons are plotted in Figs. 5-7 through 5-14.

The morning ventilation factors are found to be highest along the coast from Salinas to Oakland and in the South Coast Air Basin. Winter and fall ventilation along the coast is the lowest during the year while summer shows the highest values, particularly along the South Coast. Morning ventilation values in the Central Valley are higher than most other inland areas.

On a state-wide basis peak ventilation is greatest during summer afternoons as might be expected. Minimum afternoon values occur during the winter months on a tenth percentile basis. During the summer months the ventilation is generally greater in the inland areas than along the coast. During the balance of the year these peak ventilation factors are more comparable.

Morning ventilation in the Bay Area and the South Coast Air Basin decreases rapidly with distance from the coast. The desert areas are characterized by low values during the morning in all seasons.

Afternoon ventilation factors at Sacramento suggest lower values in spring and summer than the areas to the north and south in the Central Valley. This variation is



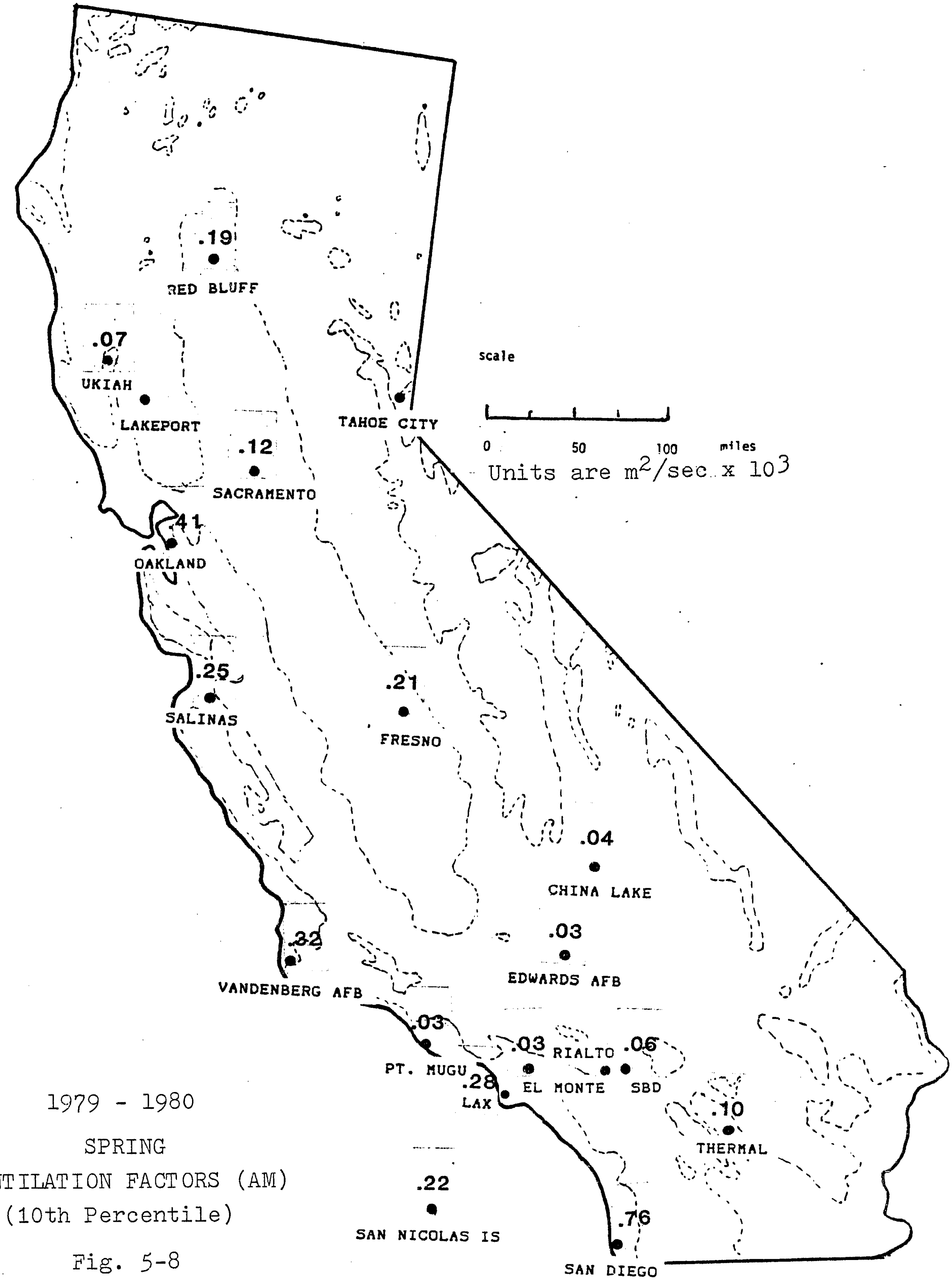
1979 - 1980

WINTER

VENTILATION FACTORS (AM)

(10th Percentile)

Fig. 5-7



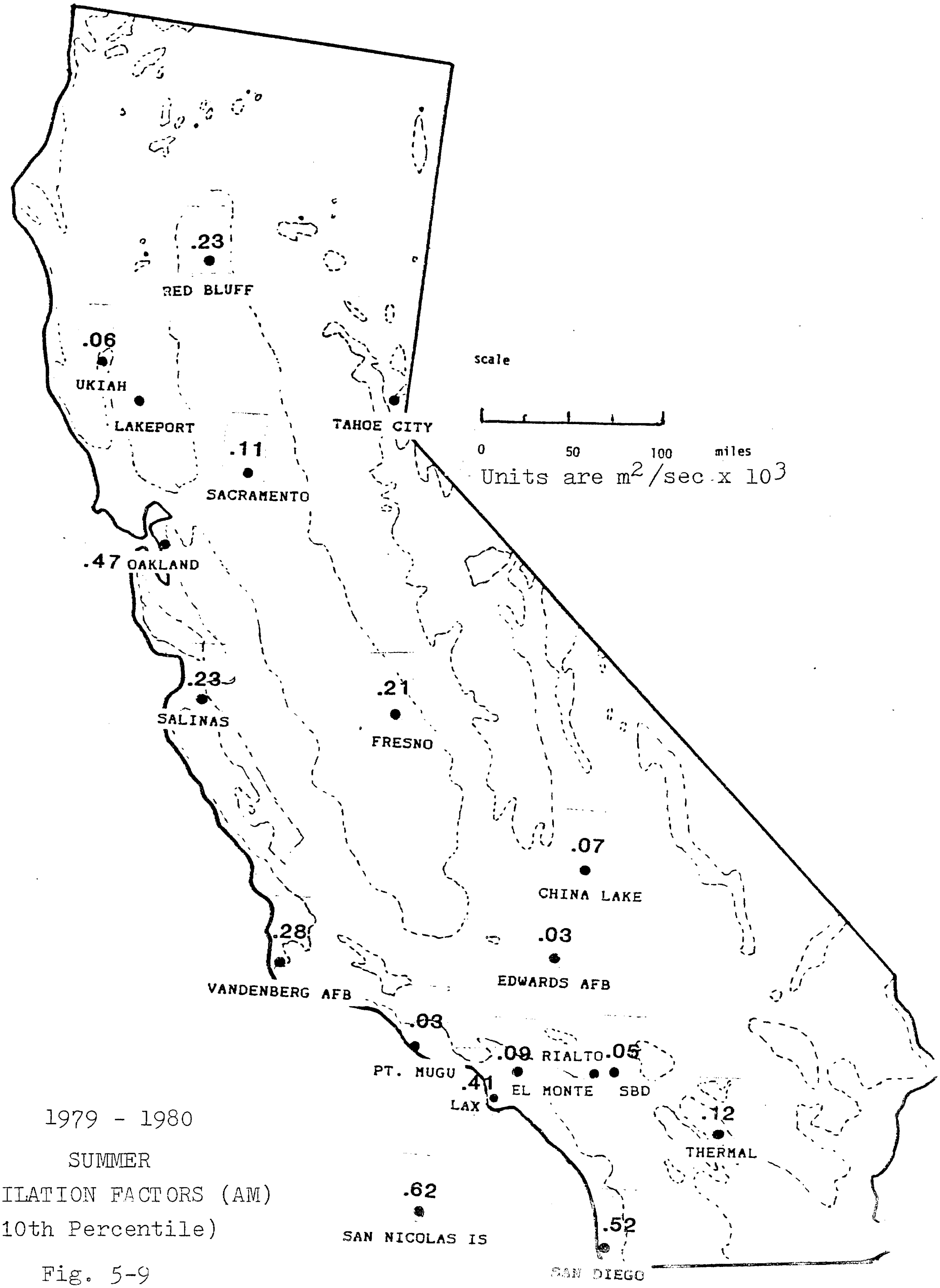
1979 - 1980

SPRING

VENTILATION FACTORS (AM)

(10th Percentile)

Fig. 5-8



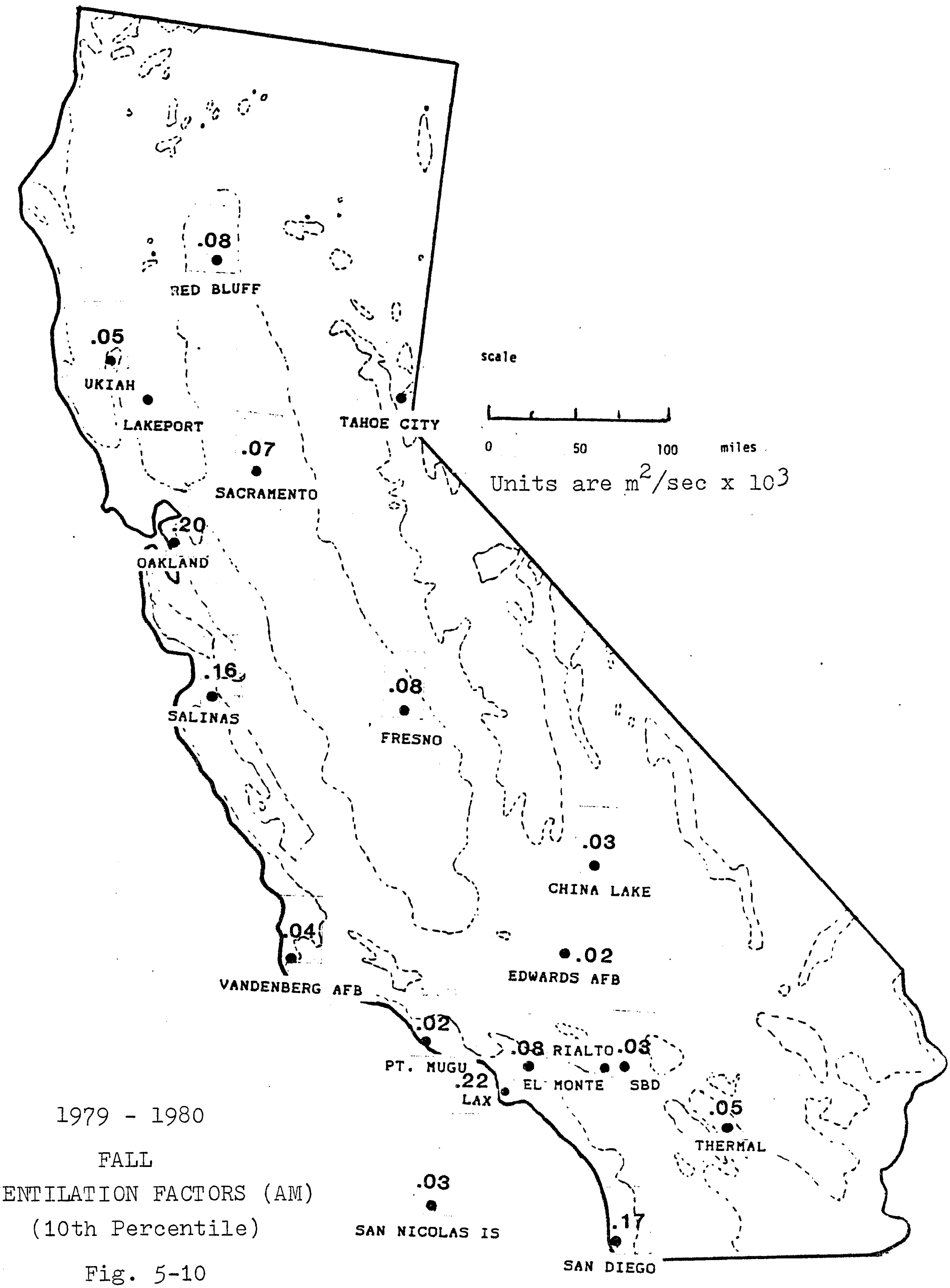
1979 - 1980

SUMMER

VENTILATION FACTORS (AM)

(10th Percentile)

Fig. 5-9



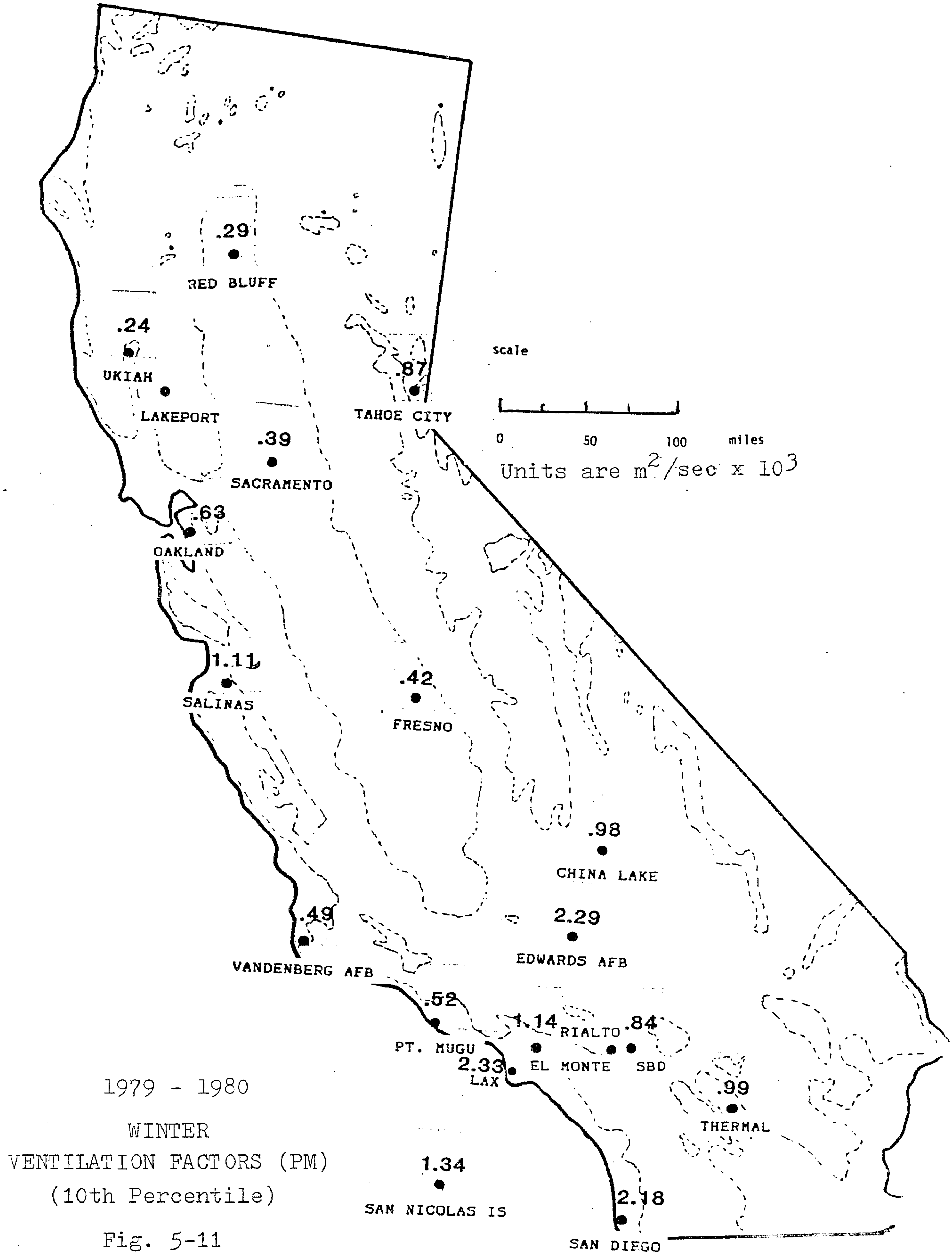
1979 - 1980

FALL

VENTILATION FACTORS (AM)

(10th Percentile)

Fig. 5-10



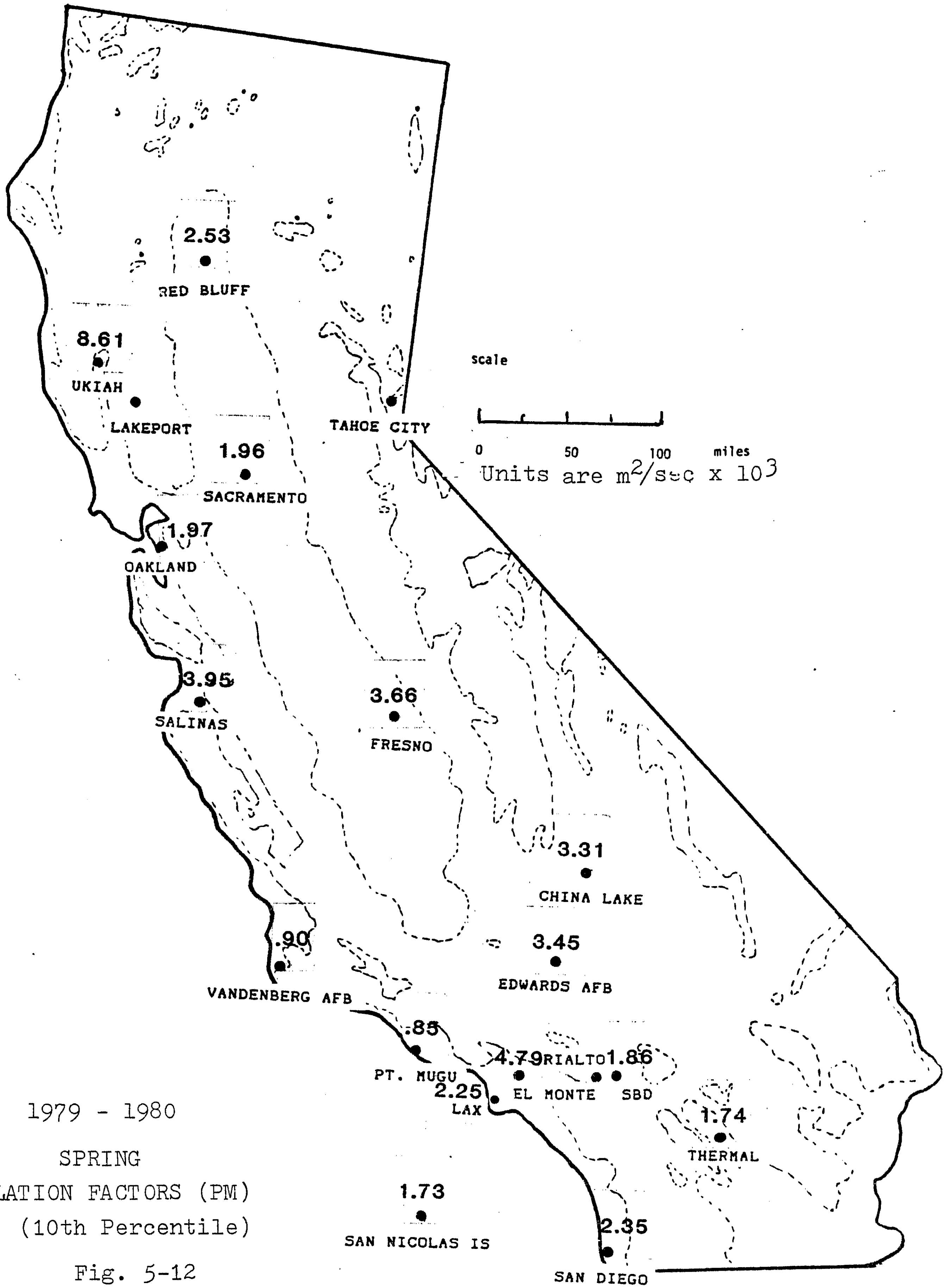
1979 - 1980

WINTER

VENTILATION FACTORS (PM)

(10th Percentile)

Fig. 5-11



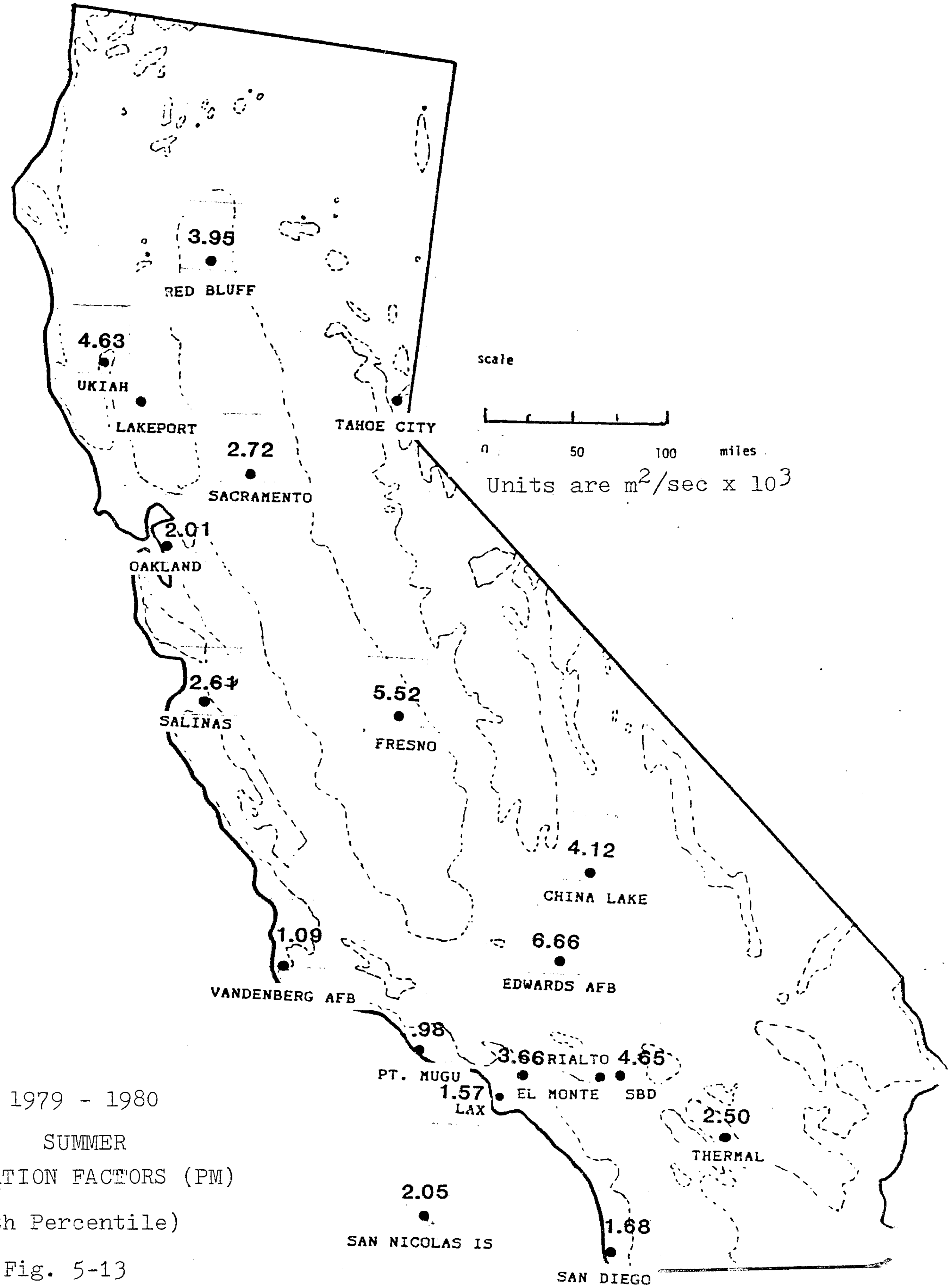
1979 - 1980

SPRING

VENTILATION FACTORS (PM)

(10th Percentile)

Fig. 5-12



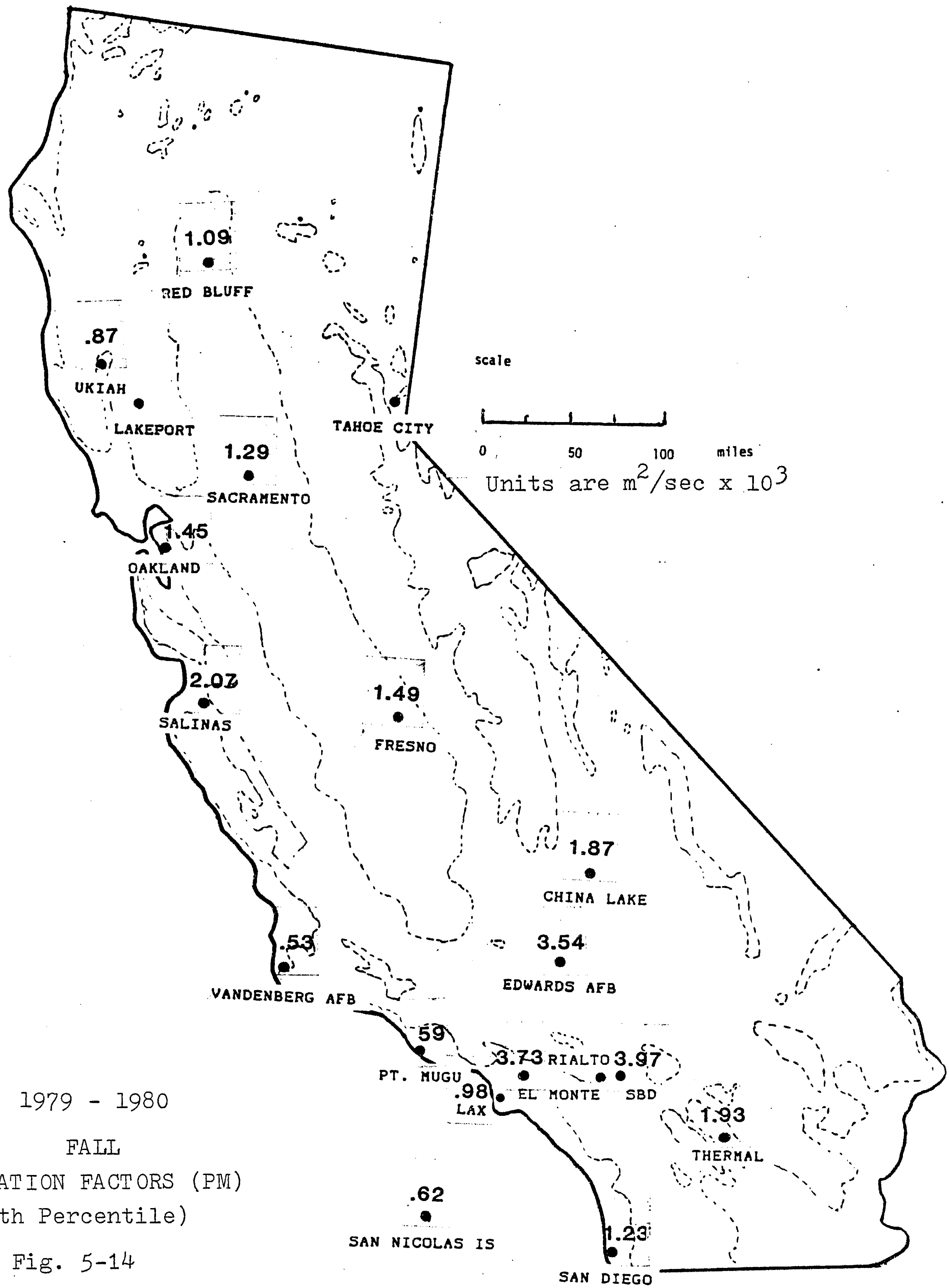
1979 - 1980

SUMMER

VENTILATION FACTORS (PM)

(10th Percentile)

Fig. 5-13



1979 - 1980

FALL

VENTILATION FACTORS (PM)

(10th Percentile)

Fig. 5-14

presumably the result of the divergent flow in the Delta area.

It is useful to examine the monthly variations in ventilation factors for the sounding locations. Sixteen of these are presented in graphical form in Figs. 5-15 through 5-22. There were insufficient data at Tahoe City to show monthly variability.

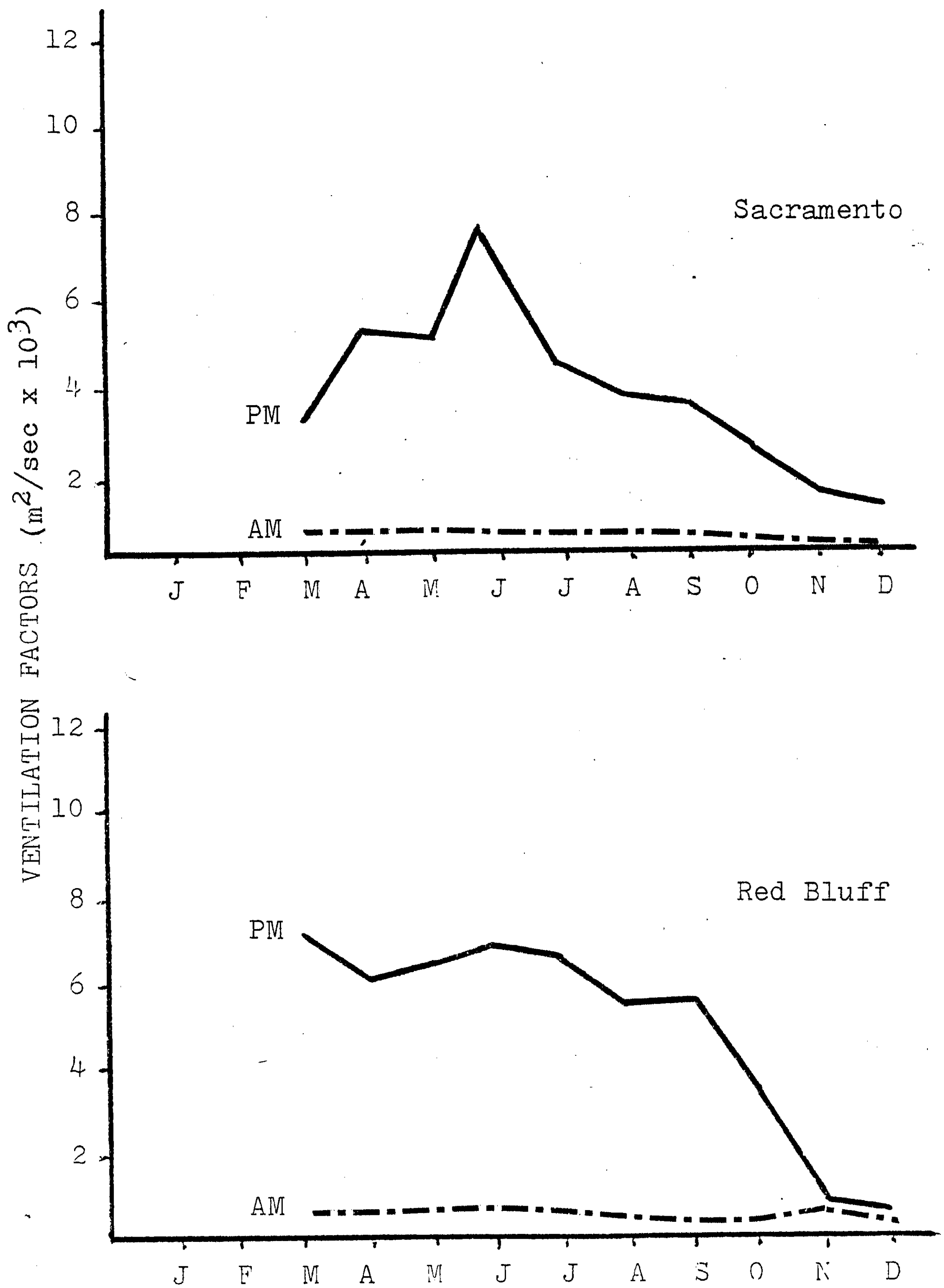
Fig. 5-15 gives the 50th percentile monthly ventilation factors for Sacramento and Red Bluff. Morning values, although small at both locations, peak in the spring. Afternoon values peak in June (also March at Red Bluff). Values at Red Bluff are characteristically higher than at Sacramento except for June. Ventilation at both locations drops off rapidly after September.

Fig. 5-16 shows the factors for Oakland and Ukiah. Peak values occur in the spring at both locations. Afternoon factors at Ukiah are generally higher than at Oakland, presumably because of deeper mixing layers. Morning ventilation at Oakland is considerably higher than at Ukiah. These two graphs illustrate the characteristic differences between coastal and inland sites.

A similar comparison is shown in Fig. 5-17 for Fresno and Salinas. During the summer the afternoon ventilation factors at Fresno are greater than at Salinas but the morning values are less. Peak ventilation at Salinas occurs in March and April.

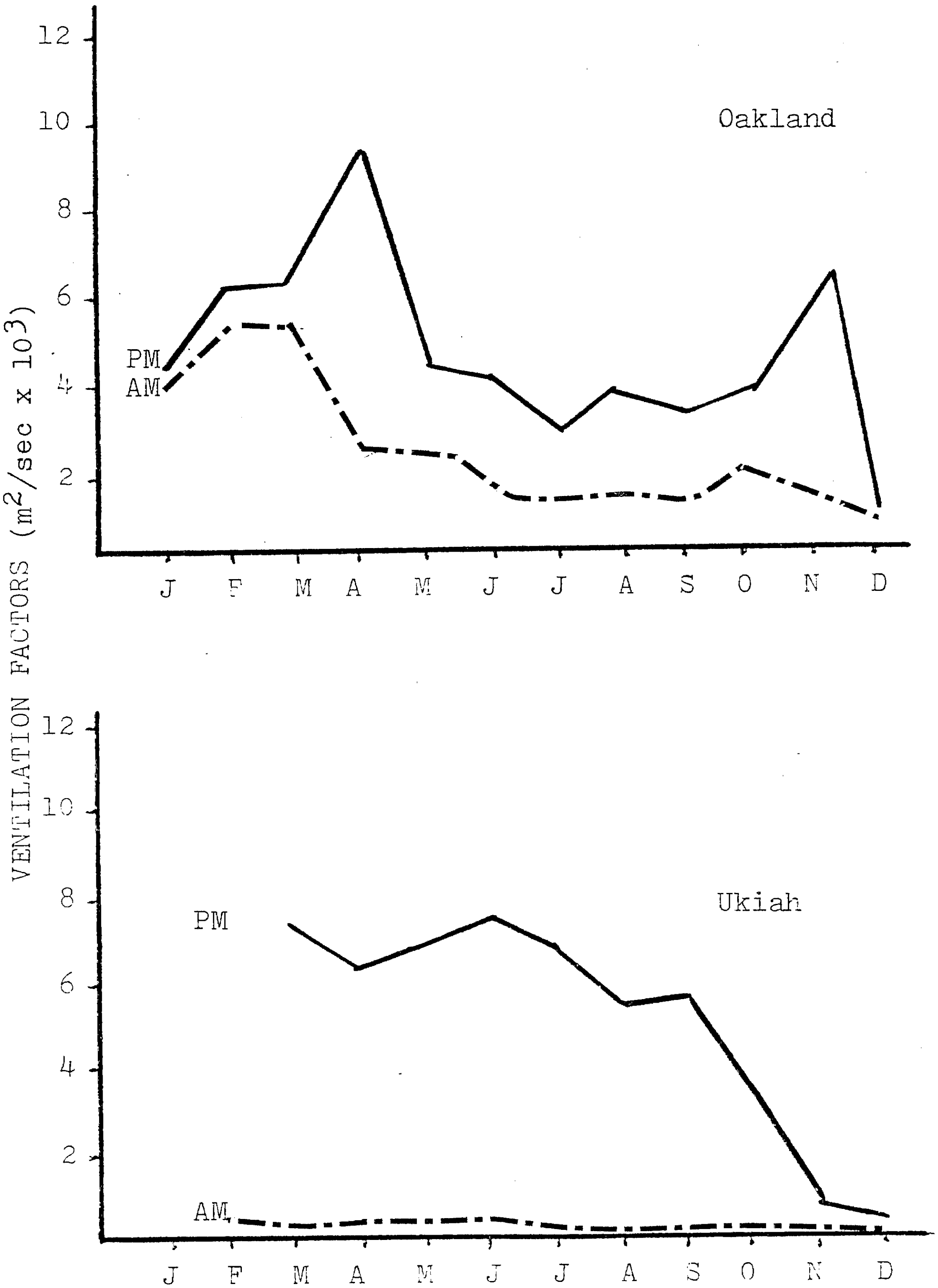
Fig. 5-18 is representative of the Mojave Desert area. Ventilation during the afternoon is relatively high during the spring and summer, decreasing in the fall. Peak values appear to occur from May to July. Morning values are generally low except in late winter and spring when synoptic events increase the wind speeds.

Two similar locations in the South Central Coast Air Basin are shown in Fig. 5-19. Vandenberg and Pt. Mugu both show high afternoon ventilation during the winter and early spring but with considerably reduced values through the summer and fall. Morning values follow the same pattern. The influence of synoptic effects is apparent during the winter.



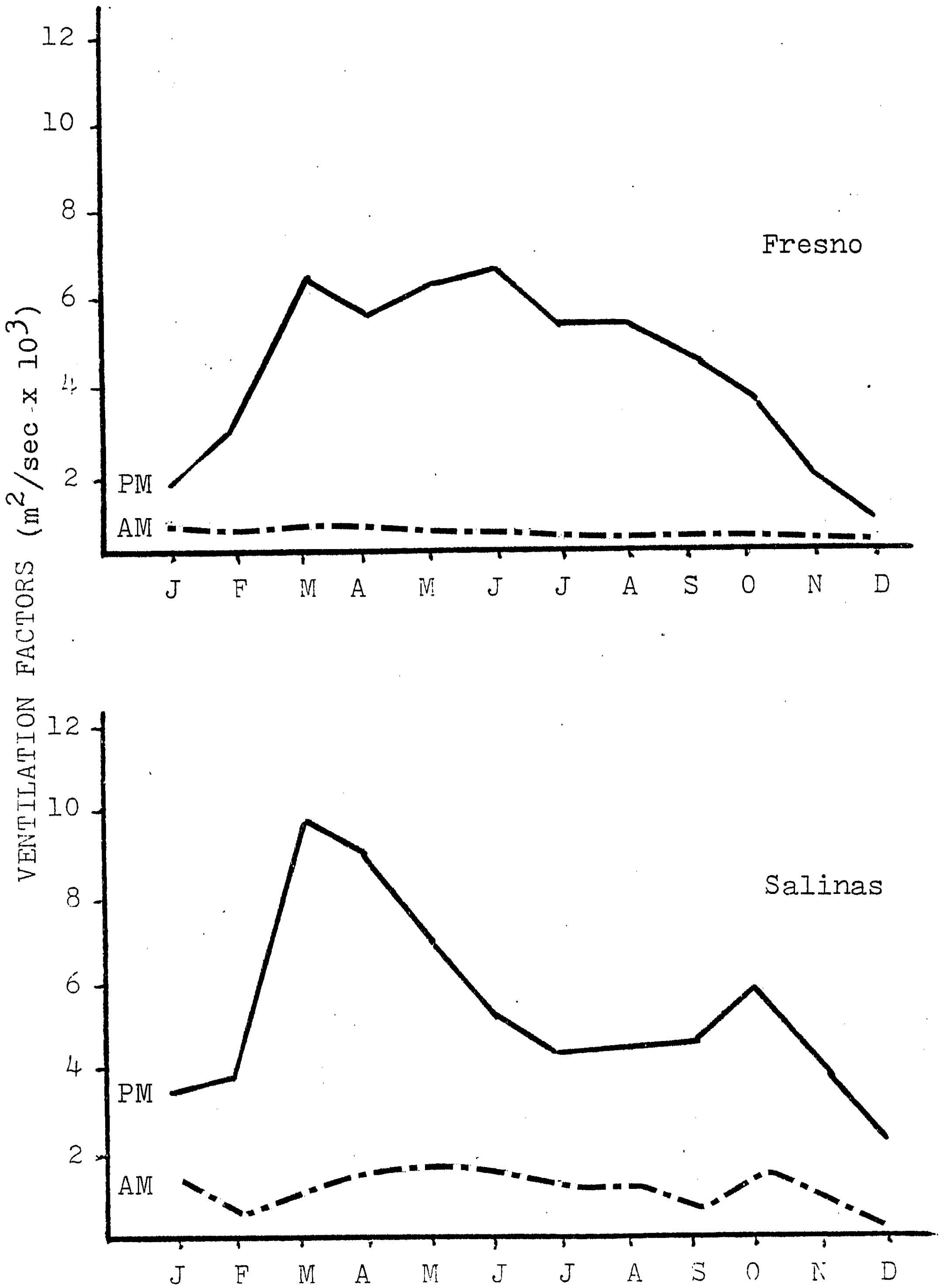
MONTHLY VARIATIONS IN VENTILATION FACTORS
(1979-1980)

Fig. 5-15



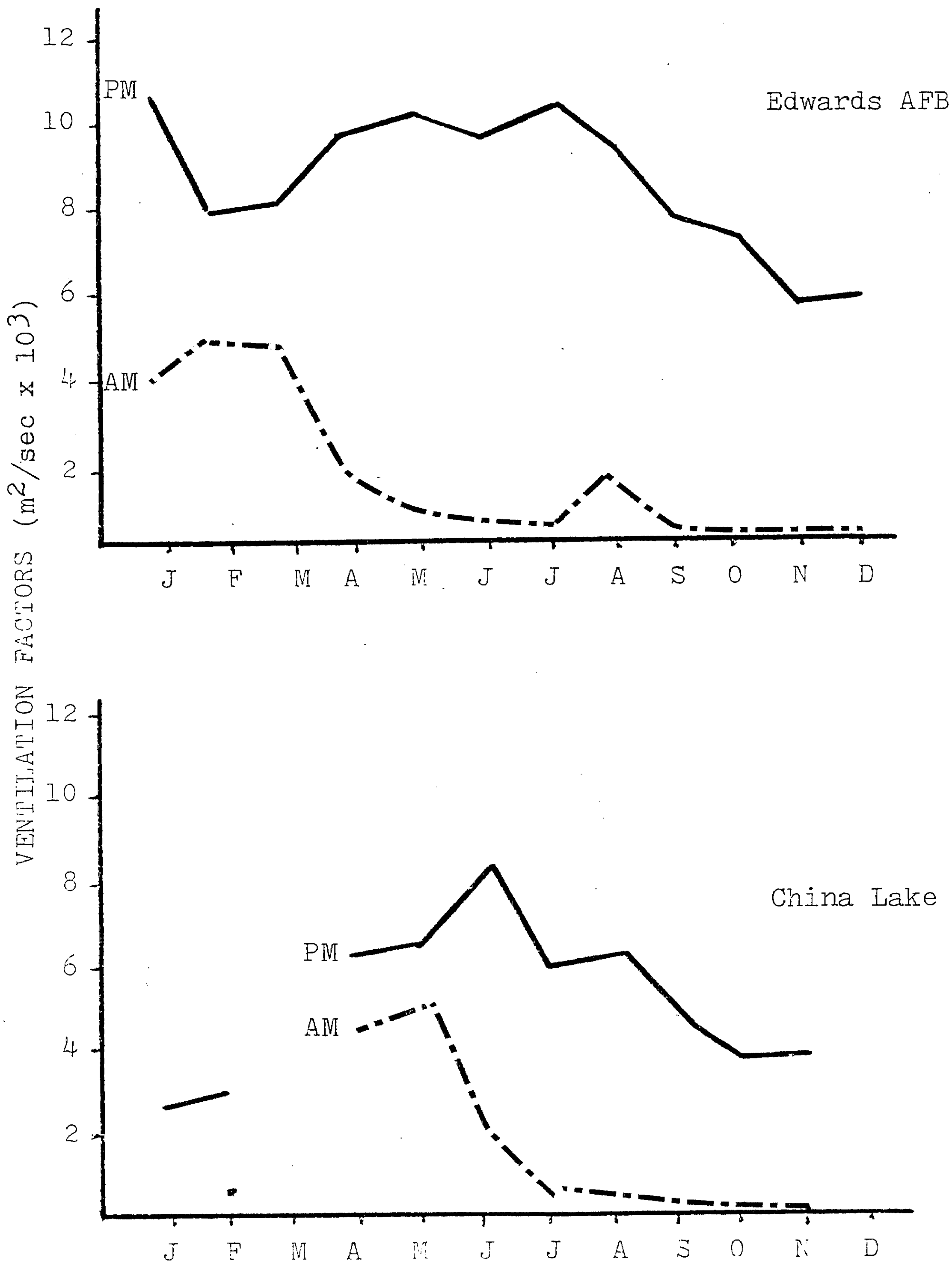
MONTHLY VARIATIONS IN VENTILATION FACTORS
(1979-1980)

Fig. 5-16



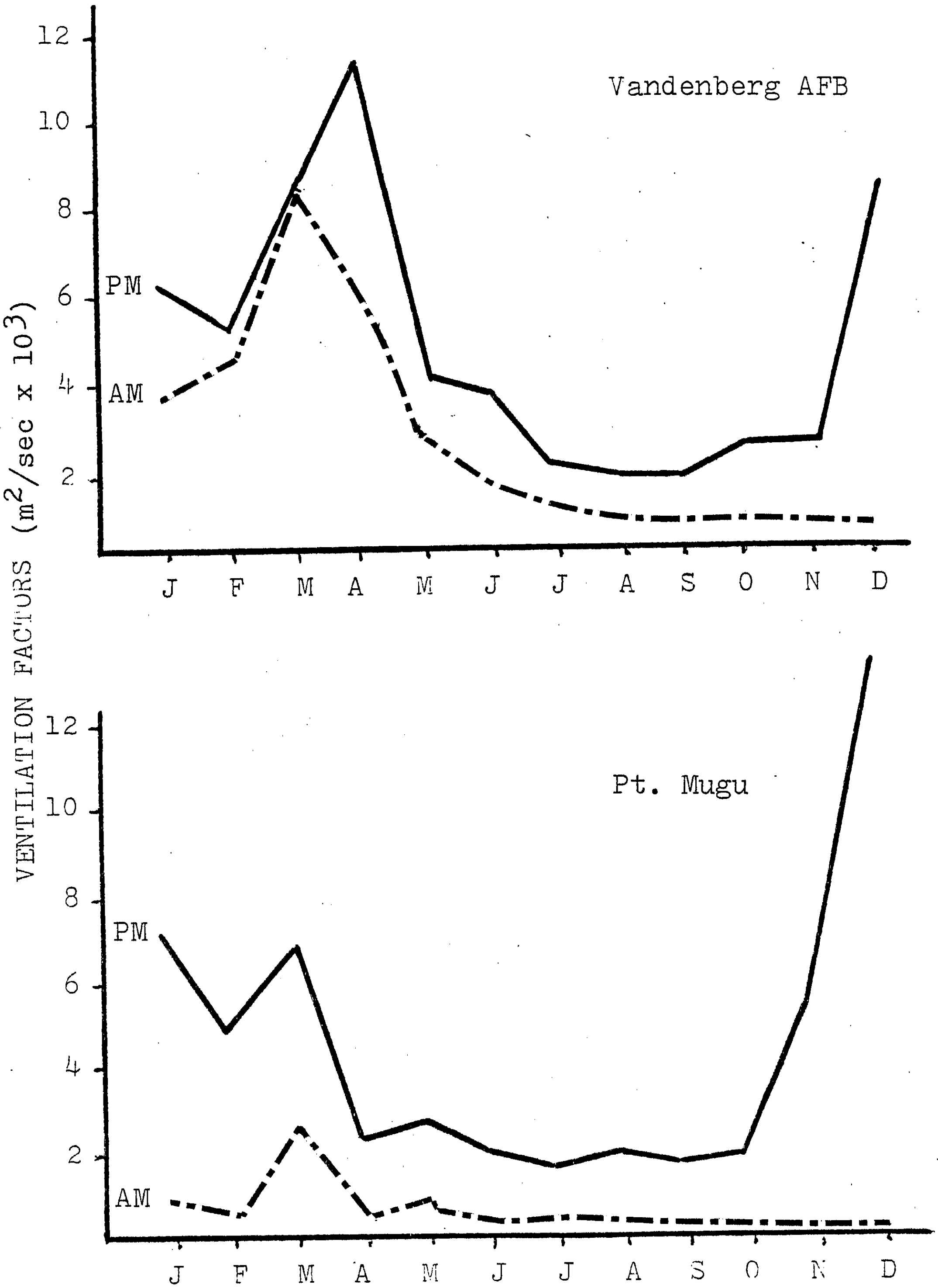
MONTHLY VARIATIONS IN VENTILATION FACTORS
(1979-1980)

Fig. 5-17



MONTHLY VARIATIONS IN VENTILATION FACTORS
(1979-1980)

Fig. 5-18



MONTHLY VARIATIONS IN VENTILATION FACTORS
(1979-1980)

Fig. 5-19

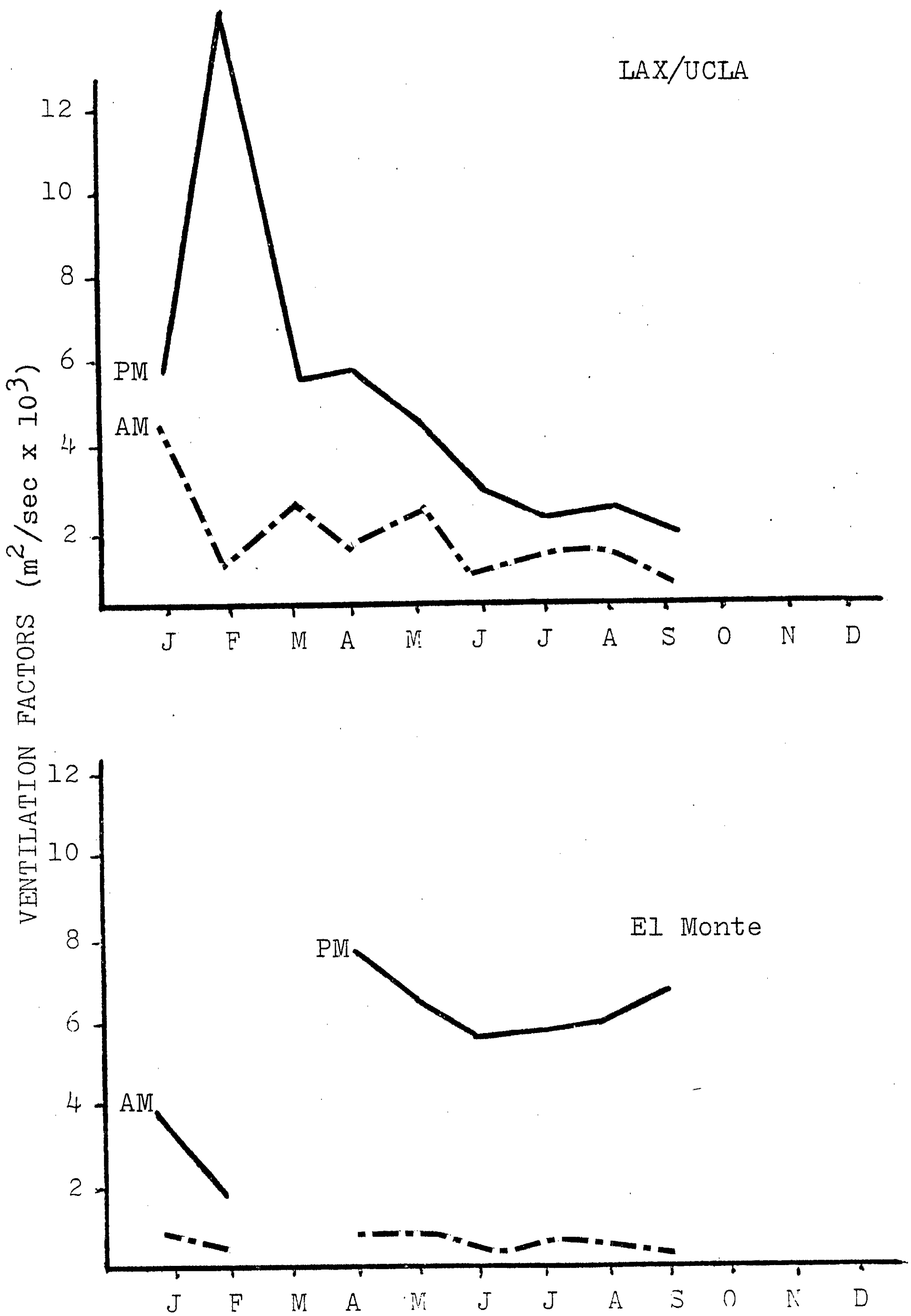
Fig. 5-20 contrasts two locations in the South Coast Air Basin. LAX/UCLA shows coastal characteristics while El Monte is typical of an inland location. Morning factors are higher at LAX/UCLA during all of the months shown. Afternoon factors peak at LAX/UCLA in the winter and early spring. At El Monte the factors are also high in April but continue relatively high during the summer and early fall.

Fig. 5-21 shows the ventilation factors for San Bernardino and Thermal. Both are typical inland sites with low morning factors throughout the year and afternoon factors which show the influence of the spring synoptic events and summer heating.

Fig. 5-22 presents the ventilation factors for San Diego and San Nicolas Is. San Diego is a typical coastal site with high values in the winter and spring, decreasing in summer. The San Nicolas data are incomplete but show comparable morning and afternoon values during the summer. Both locations indicate sharp increases in afternoon factors during the late fall but without similar changes in the morning values.

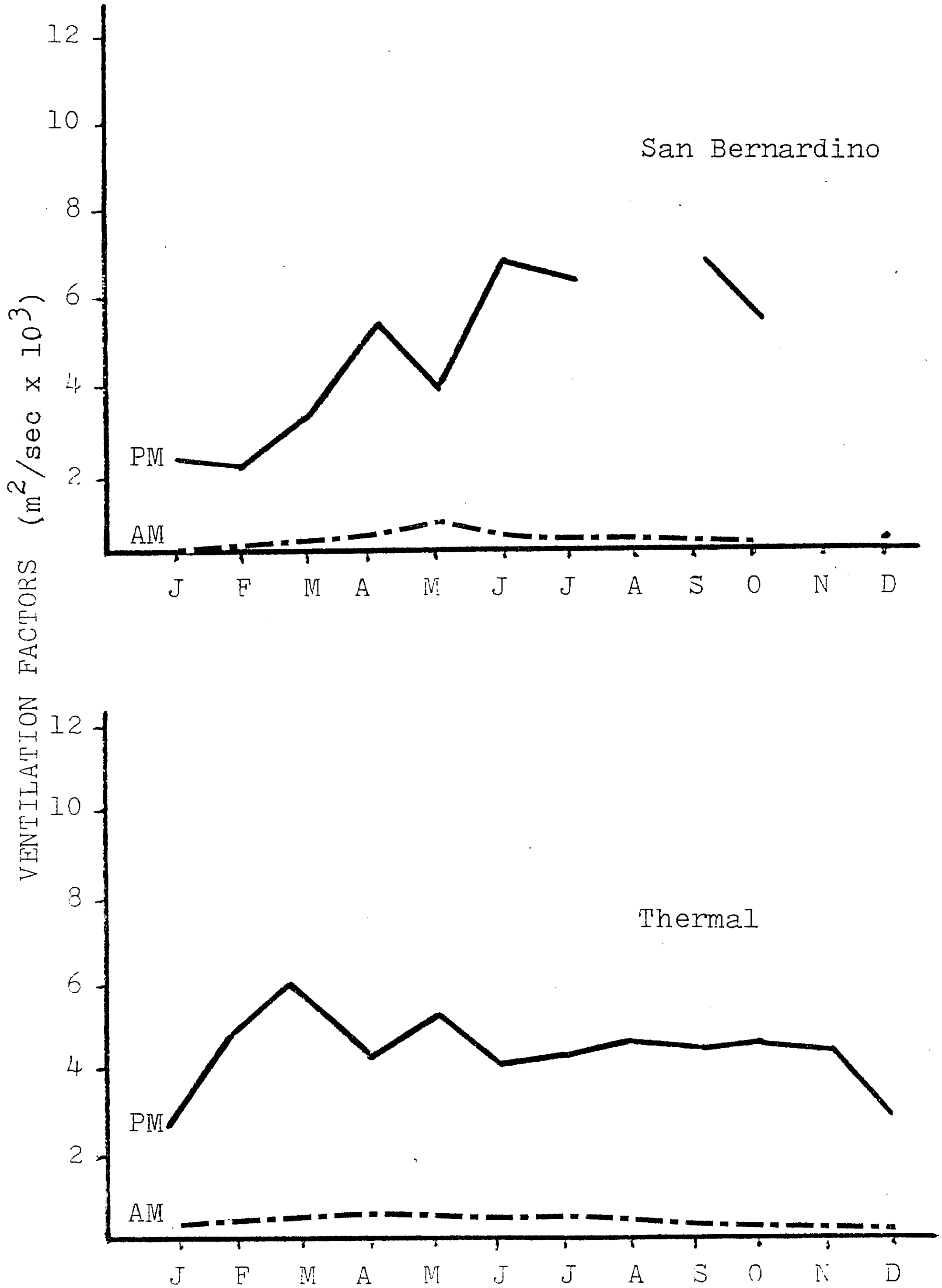
Correlations between peak ozone and ventilation factors have been computed for selected sounding locations. These correlations are shown in Table 5-6. The correlations are more consistent than those given previously for the Holzworth potential and are somewhat lower but similar to those computed for the 850 mb temperature. In general, the use of the morning ventilation yields a higher correlation with peak ozone than does the afternoon ventilation factor. With the exception of San Bernardino it is of interest that the 1980 correlations are similar to the 1979 data and do not show the generally low values which were found in the previous section.

It is concluded that the ventilation factor correlates almost as well with peak ozone as the 850 mb temperature and considerably better and more consistently than the Holzworth potential. The ventilation factor shares one of the same limitations as the Holzworth factor in identifying areas of high ozone potential; directional transport of pollutants by the wind is not considered. The correlations shown in Table 5-6 primarily examine temporal relationships and only partially express spatial realtions.



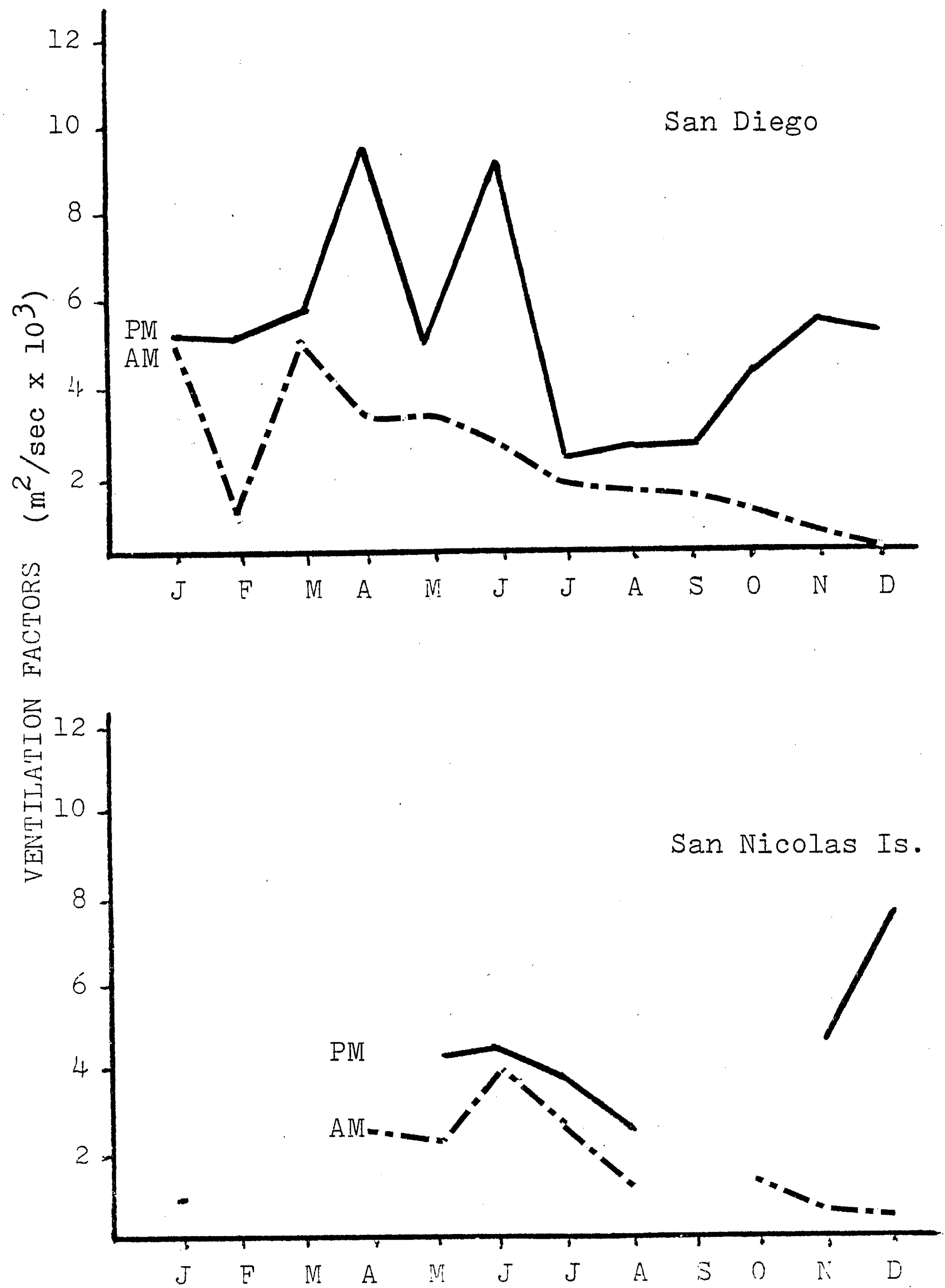
MONTHLY VARIATIONS IN VENTILATION FACTORS
(1979-1980)

Fig. 5-20



MONTHLY VARIATIONS IN VENTILATION FACTORS
(1979-1980)

Fig. 5-21



MONTHLY VARIATIONS IN VENTILATION FACTORS
(1979-1980)

Fig. 5-22

Table 5-6

Correlations of Peak Ozone Concentrations
and Ventilation Factors
(July - August)

Location	Year	Time	Correlation
Sacramento	1979	AM	-.60
		PM	-.23
	1980	AM	-.58
		PM	.04
Fresno	1979	AM	-.58
		PM	-.44
	1980	AM	-.47
		PM	-.03
Pt. Mugu (Piru)	1979	AM	-.21
		PM	-.14
	1980	AM	-.27
		PM	-.41
San Bernardino (Fontana)	1979	AM	-.63
		PM	-.07
	1980	AM	-.12
		PM	-.06
Los Angeles (UCLA) (Fontana)	1979	AM	-.29
		PM	-.55
El Monte (Fontana)	1979	AM	-.52
		PM	-.31

5.4 Temperature Relationships

It has been recognized from smog chamber tests that warm temperatures increase the rate of ozone formation. It is therefore reasonable to examine the relationship between maximum temperature and peak ozone at several key locations in the state. Table 5-7 gives the correlations obtained.

Table 5-7

Maximum Temperature vs. Peak Ozone
(July - August)

	1979	1980
Red Bluff	.53	.44
Sacramento	.70	.69
Fresno	.81	.84
Bakersfield	.71	.57
Lancaster	.20	.40
San Bernardino	.73	.73
Palm Springs	.48	.60

At all comparable locations the correlation coefficients shown in Table 5-7 are higher than given in Table 5-1 which used the 850 mb temperature and had the most promising results of the previous parameters tested. As was the case in Table 5-1 the correlations with maximum temperature are relatively consistent from one year to the next, lending some credence to the significance of the numbers.

In Table 5-7 the correlations at Red Bluff, Lancaster and Palm Springs are relatively low in comparison with the remainder of the locations. These areas are not recognized as significant source areas so that a lower correlation between ozone and maximum temperatures at those locations is not surprising.

There is, of course, a strong correlation between the 850 mb temperature and the maximum surface value for the day. Both tend to be associated with low inversions and stable temperature lapse rates. The influence of temperature on chemical reaction rates may not be as significant in these correlations as the overall meteorological conditions which warm temperatures represent.

Surface temperatures have another possible effect on pollution potential. Under particular conditions, especially in inland areas, warm afternoon surface temperatures may result in the destruction of the inversion layer and the consequent, upward dilution in pollutants. The extent to which this occurs at some of the inland locations was examined during this study but with little success. Determination of a break in the inversion was made by comparison of the surface potential temperatures and the potential temperature at the top of the inversion. A verification of the inversion break was sought in the behavior of other parameters such as temperature, humidity, visibility and/or ozone. Results of the study indicated that the inversion break could not be identified with reasonable certainty, at least in part because the sounding and surface temperatures were made by different and not necessarily comparable instrument systems.

The relationship between the time of peak ozone and the time of the maximum temperature also contains useful information. If the peak ozone concentrations and maximum temperatures are related as suggested above, it might be expected that maximum ozone and temperature might occur at nearly the same time.

Table 5-8 shows the relationships between these times for the stations shown in the previous table.

Table 5-8

Comparison of Times of Peak Ozone and Temperature
(July - August)
(1979-80)

Location	Median Time between Peaks
Red Bluff	-4 hours
Sacramento	-2
Fresno	-4
Bakersfield	-4
Lancaster	1
San Bernardino	0
Palm Springs	4

(negative sign means that ozone peak occurs first)

There is a wide range of time differences shown in the table. For those locations from Red Bluff to Bakersfield the ozone peak occurs some two to four hours before the temperature peak. This will occur if the precursor concentrations are diluted significantly by the time of the maximum temperatures. Prior to this time, ozone and precursor concentrations are higher. Such dilution can take place by rapid vertical mixing or by horizontal transport away from the area. In either event these locations should be considered as source areas which transport their pollutants to other areas.

In a case such as Palm Springs where the peak ozone tends to occur about four hours after the maximum temperature, this condition must occur through transport into the area from upwind. Palm Springs would thus be considered as a receptor area.

Lancaster shows a median time difference of one hour. This suggests that Lancaster is a receptor area but that significant ozone development may occur within a short distance upwind.

San Bernardino has a median time difference of zero hours. This could be interpreted as ozone formation in the vicitniy of San Bernardino, corresponding to the daily temperature cycle, or transport from upwind which happens to arrive at the time of the maximum temperature. In either case, the data suggest that considrable ozone formation tends to occur close to or slightly upwind of San Bernardino.

Further details on the time differentials at Red Bluff and Palm Springs are given in Table 5-9. The full distributions of time differences between ozone and temperature maxima are shown in the table. From the table it is clear that the source vs. receptor orientations of the two locations produce markedly different distributions.

Unger (1983) approached the problem of source/receptor areas on the basis of the ratio of maximum ozone concentrations vs. morning precursor concentrations (NMHC NO_x). High values of the ratio suggested receptor areas while low values indicated source areas. Lancaster and San Bernardino were found to be high in the rank order

Table 5-9

Time Differences between Maximum O_3 and Temperature
July 1979-80

Red Bluff Time Difference	Red Bluff No. Occurrences	Palm Springs No. Occurrences
-7 hrs.	3	
-6	8	1
-5	9	3
-4	9	2
-3	9	
-2	5	1
-1	3	
0	4	
1	4	2
2		8
3		7
4		19
5		7
6		2
7		5

(negative difference means ozone peak occurred first) of ratios (receptor areas). Sacramento, Fresno and Bakersfield appeared from mid-ranking to near the bottom of the list (source areas). Unger's ordered ranking of the ratio values is given in Table 5-10. The list is ranked from receptor areas (Lancaster) to source areas (San Francisco - 23rd).

Table 5-10

Ranking of Ratio (Max O_3/morning NMHC·NO_x)
(from Unger, 1983)

1.	Lancaster	30.	Fresno
2.	Brown Field	31.	Santa Barbara
3.	San Bernardino	32.	Stockton
4.	Reseda	33.	Chula Vista
5.	Upland	34.	Riverside (Magnolia)
6.	Newhall	35.	Oceanside
7.	Riverside (Rubidoux)	36.	Indio
8.	Port Hueneme	37.	Anaheim
9.	Chico	38.	Fremont
10.	Napa	39.	Modesto
11.	Azusa	40.	Camarillo
12.	Pomona	41.	El Cajon
13.	Gilroy	42.	Whittier
14.	Pasadena	43.	San Jose
15.	Visalia	44.	Vallejo
16.	Escondido	45.	Santa Rosa
17.	Livermore	46.	Sunnyvale
18.	San Diego - Overland	47.	Lynwood
19.	Merced	48.	Bakersfield
20.	Goleta	49.	Downtown Los Angeles
21.	Sacramento	50.	San Diego (Island)
22.	San Luis Obispo	51.	West Los Angeles
23.	Temple City	52.	Richmond
24.	Pittsburg	53.	Redwood City
25.	Salinas	54.	San Francisco (Ellis)
26.	Delano	55.	San Rafael
27.	La Habra	56.	Oakland
28.	Burbank	57.	Lennox
29.	Pico Rivera	58.	San Francisco (23rd)

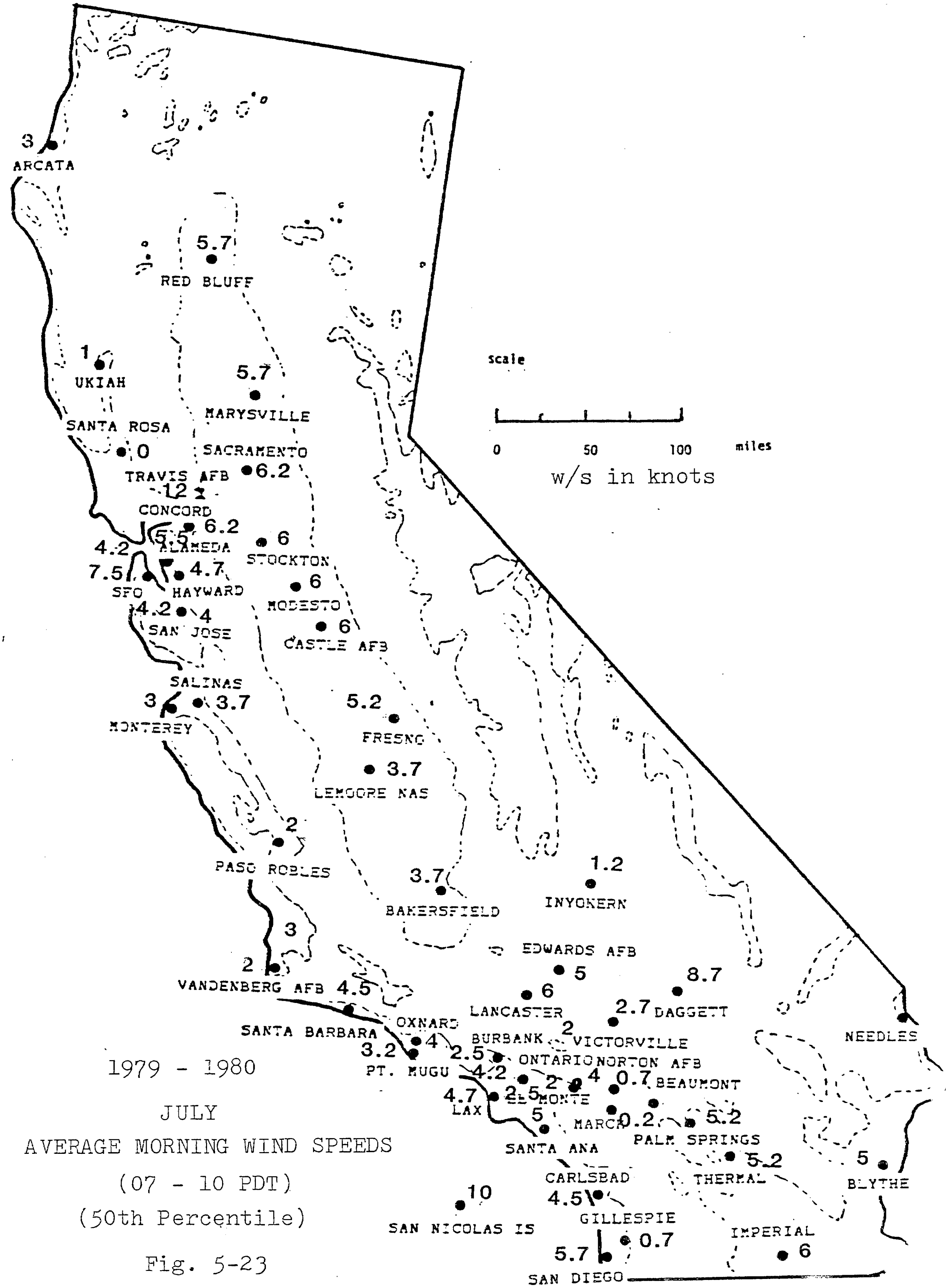
5.5 Low Wind Speeds

A major meteorological influence in California on the generation of high pollutant concentrations is the occurrence of light winds during the morning hours. Light winds combined with low mixing heights during morning peak traffic hours permits the build-up of high concentrations which subsequently are transported downwind. The state-wide distribution of 10 percentile winds has been given in a previous section for 08, 12 and 16 PST. These charts show the occurrences of low wind speeds (less than 3 knots) at 08 PST at many locations in the state. All wind data were taken from airport locations and should have reasonable site exposures. At very low wind speeds, however, (i.e, below 3 knots) the response of many airport anemometers is not very good and "calm" may merely represent a speed of less than 3 knots.

Significant accumulation of pollutants, however, occurs with a protracted period of low wind speeds. Indications of regions susceptible to accumulation were obtained by examining the distribution of average morning wind speeds at each location. For the purposes of the present study the average morning wind speed was considered to be the arithmetic average of the 07, 08, 09 and 10 PDT values for each day. The 50th percentile values for each location are plotted in Fig. 5-23 for July. The 10th percentile average wind speeds for each location in July are shown in Fig. 5-24. Tables 5-11 and 5-12 give the rank orders of 50th and 10th percentile values for the stations included in the study.

In Fig. 5-23, the map of 50th percentile values shows four regions of light, morning wind speeds. These are the Ukiah/Santa Rosa area, the March Field/San Bernardino area, Gillespie Field and the Inyokern area. All of these show average wind speeds (07-10 PDT) of less than two knots on a 50th percentile basis. The coastal areas, the Central Valley and the remainder of the Mojave Desert all show average wind speeds generally 2-4 times the averages for the low wind speed areas.

The tenth percentile data (Fig. 5-24) indicate, in addition to the above low wind speed areas, that the Salinas Valley, the South Coast Air Basin and much of the Mojave Desert experience low morning wind speeds on some



1979 - 1980

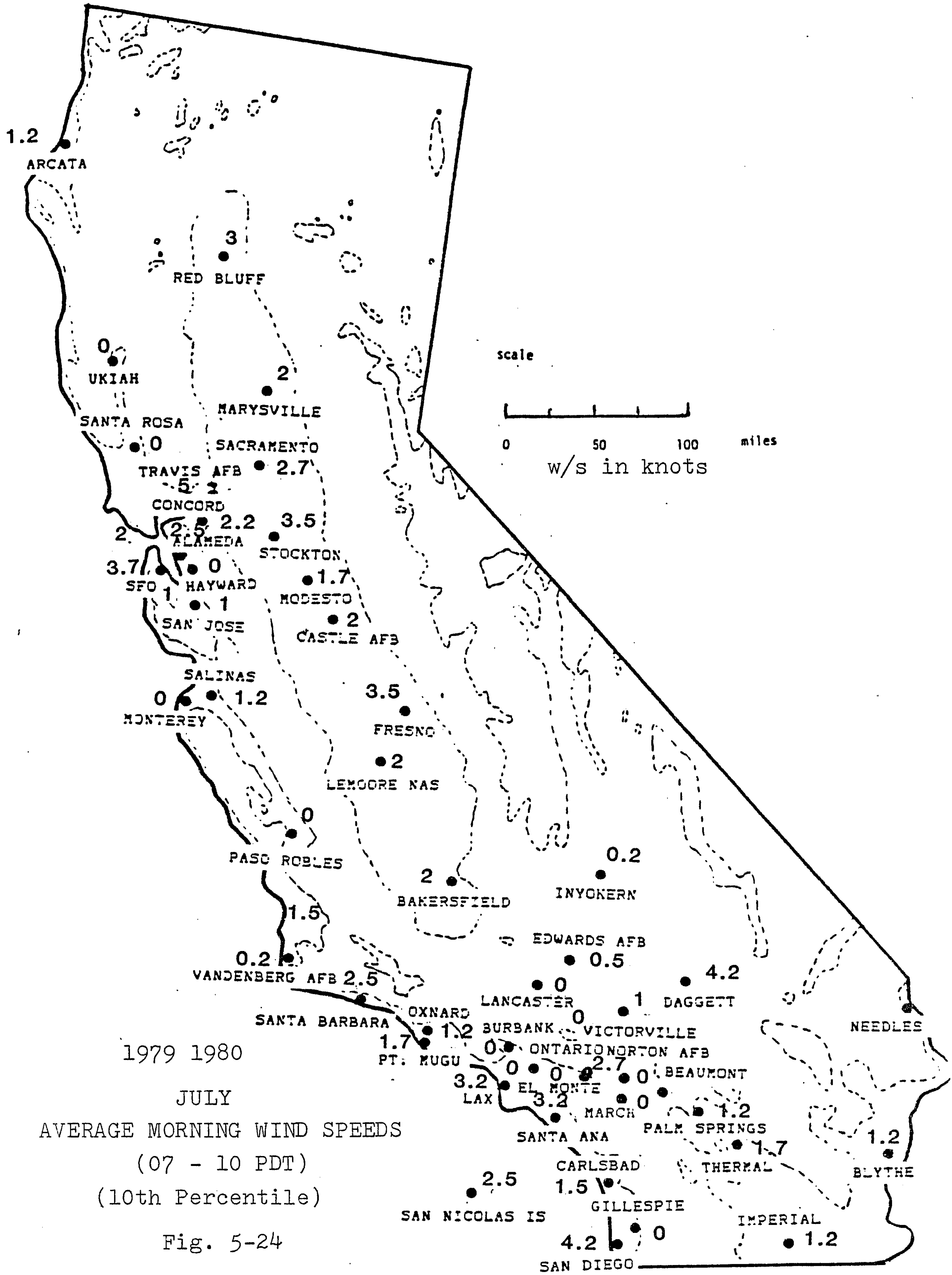
JULY

AVERAGE MORNING WIND SPEEDS

(07 - 10 PDT)

(50th Percentile)

Fig. 5-23



1979 1980

JULY

AVERAGE MORNING WIND SPEEDS

(07 - 10 PDT)

(10th Percentile)

Fig. 5-24

Table 5-11

Rank Distribution of 50 Percentile Average Wind Speeds

July (07-10PDT)
1979-80

Rank	Location	Wind Speed (knots)	Rank	Location	Wind Speed (knots)
1.	Santa Rosa	0	15.	Carlsbad	4.5
2.	March AFB	0.5		Oakland	4.5
3.	Gillespie Field	0.7		Santa Barbara	4.5
	Norton AFB	0.7	16.	Hayward	4.7
4.	Ukiah	1.0		LAX	4.7
5.	Inyokern	1.2	17.	Blythe	5.0
6.	Palmdale	2.0		Edwards AFB	5.0
	Paso Robles	2.0		Orange Co. AP	5.0
	Vandenberg AFB	2.0	18.	Fresno	5.2
7.	La Verne	2.2		Palm Springs	5.2
8.	Burbank	2.5		Thermal	5.2
	El Monte	2.5	19.	Marysville	5.7
9.	George AFB	2.7		Red Bluff	5.7
10.	Arcata	3.0		San Diego	5.7
	Monterey	3.0	20.	Castle AFB	6.0
	Santa Maria	3.0		Imperial	6.0
11.	Pt. Mugu NAS	3.2		Lancaster	6.0
12.	Bakersfield	3.7		Modesto	6.0
	Lemoore NAS	3.7		Stockton	6.0
	Salinas	3.7	21.	Sacramento (Ex.AP)	6.2
13.	Ontario	4.0	22.	Concord	6.7
	Oxnard	4.0	23.	San Francisco AP	7.5
	San Jose	4.0	24.	Daggett	8.7
14.	Alameda	4.2	25.	San Nicolas Is.	10.0
	San Carlos	4.2	26.	Travis AFB	12.0
	Santa Monica	4.2			

Table 5-12

Rank Distribution of 10 Percentile Average Wind Speeds

July (07-10 PDT)
1979-80

Rank	Location	Wind Speed (knots)	Rank	Location	Wind Speed (knots)
1.	Burbank	0	6.	Modesto	1.7
	El Monte	0		Pt. Mugu	1.7
	Gillespie Field	0		Thermal	1.7
	Hayward	0	7.	Bakersfield	2.0
	Lancaster	0		Castle AFB	2.0
	La Verne	0		Lemoore NAS	2.0
	March AFB	0		Marysville	2.0
	Monterey	0		Oakland	2.0
	Norton AFB	0	8.	Concord	2.2
	Palmdale	0		Santa Monica	2.2
	Paso Robles	0	9.	Alameda	2.5
	Santa Rosa	0		San Nicolas Is.	2.5
	Ukiah	0		Santa Barbara	2.5
2.	Edwards AFB	0.2	10.	Ontario	2.7
	Inyokern	0.2		Sacramento	2.7
	Vandenberg AFB	0.2	11.	Red Bluff	3.0
3.	George AFB	1.0	12.	LAX	3.2
	San Carlos	1.0		Orange Co. AP	3.2
	San Jose	1.0	13.	Fresno	3.5
4.	Arcata	1.2		Stockton	3.5
	Blythe	1.2	14.	Daggett	4.2
	Imperial	1.2		San Diego	4.2
	Oxnard	1.2		San Francisco AP	4.2
	Palm Springs	1.2	15.	Travis AFB	5.0
	Salinas	1.2			
5.	Carlsbad	1.5			
	Santa Maria	1.5			

days. The morning wind speeds in the Central Valley average 2-3 knots on a tenth percentile basis which makes the potential for morning pollutant accumulation somewhat less than experienced in other parts of the state.

Ranked tenth percentile data in Table 5-12 indicate zero (less than 3 knots) average wind speeds in a number of coastal locations, the Ukiah/Santa Rosa area, the western Mojave Desert and several locations in the South Coast Air Basin.

5.6 Low Wind Speeds vs. Low Mixing Heights

It has been pointed out that low morning wind speeds and low mixing heights both contribute to increased air pollution potential. Low wind speeds in the morning permit the accumulation of pollutants during the morning traffic hours which then react photochemically as they are transported downwind during the afternoon. Low mixing heights in the morning contribute to the pollutant accumulation but tend to occur simultaneously with low wind speeds and hence do not provide a strong independent relationship. Low mixing heights in the afternoon, however, tend to maintain higher pollutant concentrations in the mixed layer and therefore provide additional information to evaluate the potential impact of the morning wind speed conditions.

Low morning wind speeds (10 percentile values) and low afternoon mixing heights (10 percentile) have been plotted in Fig. 5-25 to indicate how these two parameters occur in combination at the various sounding locations.

In the left portion of the diagram are all of the coastal locations where afternoon mixing heights remain relatively low, regardless of morning wind speeds. Locations such as Vandenberg AFB and Pt. Mugu (low morning wind speeds and low afternoon mixing heights) have a potential for pollution problems but do not generally have the upwind emission sources which could be transported onshore in the afternoon. The Salinas Valley, however, has a major emission source upwind at the coast line.

At the far right of the diagram are the desert and Central Valley locations where strong surface heating provides deep mixing layers during the afternoon. This mixing serves to dilute the pollutants during the afternoon, regardless of the wind speed in the morning.

Between these two extremes in the diagram are locations such as Rialto/San Bernardino, El Monte and Ukiah where morning wind speeds are very low and where afternoon mixing depths are intermediate between the coastal and interior areas. It is in these areas where low morning wind speeds and relatively low mixing heights combine with upwind emission sources to produce many of the primary pollutant problems in the state.

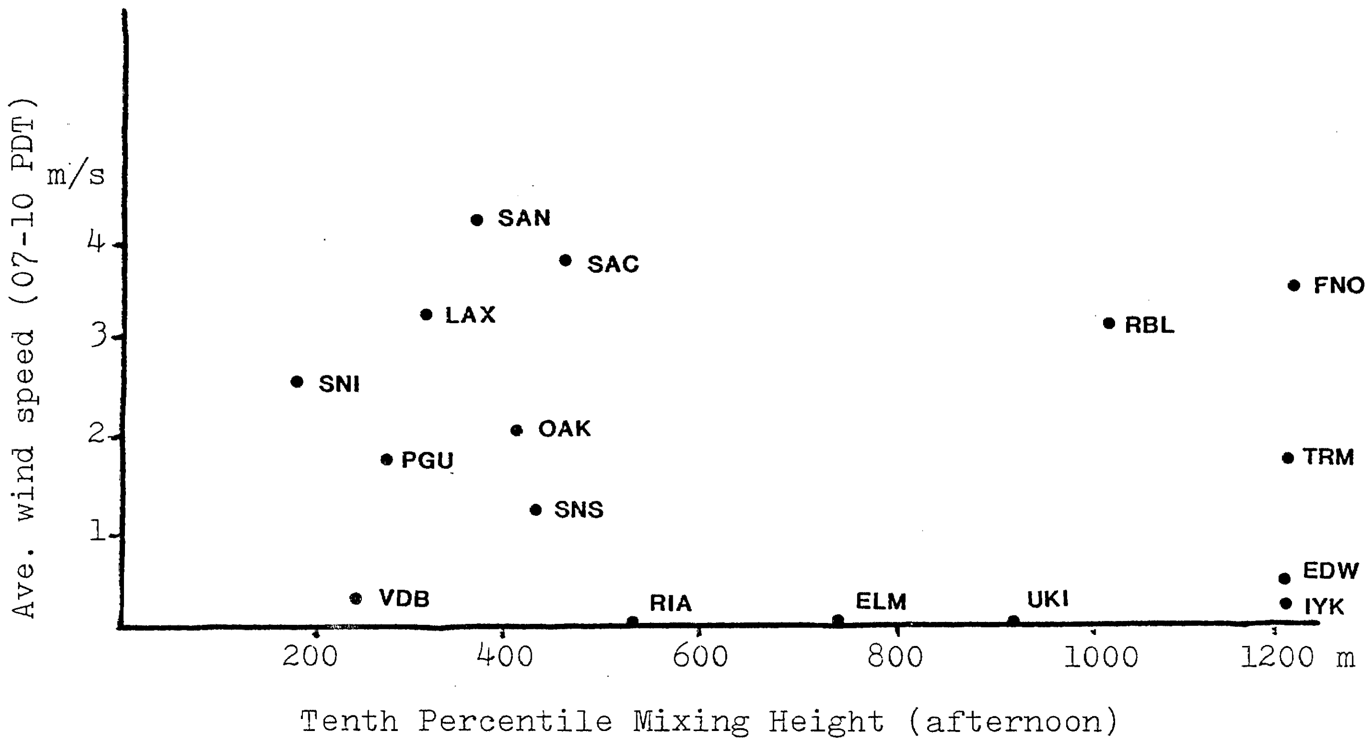


Fig. 5-25 VARIATIONS IN MORNING WIND SPEEDS AND AFTERNOON MIXING HEIGHTS

July 1979-1980

Legend

EDW - Edwards AFB	RIA - Rialto
ELM - El Monte	SAC - Sacramento
FNO - Fresno	SAN - San Diego
IYK - Inyokern	SNI - San Nicolas Is.
LAX - Los Angeles AP	SNS - Salinas
OAK - Oakland	TRM - Thermal
PGU - Pt. Mugu	UKI - Ukiah
RBL - Red Bluff	VDB - Vandenberg AFB

The data in Fig. 5-25 were derived only for those locations where sounding data were available. On the basis of the scenario above it is possible to comment on other portions of the state where detailed sounding information is not available.

1. Ukiah/Santa Rosa - Both Ukiah and Santa Rosa exhibit very low morning wind speeds during the summer and fall. Mixing heights at Ukiah during July afternoons are relatively high and provide moderately good dilution of the morning pollutant accumulation. Maximum temperatures at Santa Rosa, however, are some 10°F lower than at Ukiah and it would be expected that the mixing heights might also be less. The Santa Rosa end of the Russian River Valley may therefore have a higher pollution potential than indicated for Ukiah.

2. San Jose/Hayward/San Carlos - The southern end of the San Francisco Bay Air Basin shows tenth percentile average morning wind speeds (Fig. 5-24) of 0-1 knot. Information on mixing heights, however, is not available. The area should be partially under the influence of the lower afternoon mixing heights along the coast. Maximum temperatures at San Jose are comparable to those at Santa Rosa and a comparable air pollution potential is suggested.

3. San Bernardino/March AFB - Low average morning wind speeds occur in this area, even at the 50th percentile level (0.7 and 0.2 knots, respectively). Afternoon mixing heights in the area are somewhat uncertain due to the limited height of the San Bernardino soundings. For this reason, the August mixing height value for Rialto was used in Fig. 5-25 together with the wind speed from Norton AFB. A further complication in the area is that, at times, the coastal mixing layer moves as far east as San Bernardino and Riverside, resulting in restricted vertical mixing. In view of the uncertain mixing height data, the San Bernardino/March AFB area should be treated as one with significant air pollution potential.

4. San Diego Air Basin - The immediate inland areas of the San Diego Air Basin (e.g. Gillespie Field) show very low morning wind speeds in spite of the stronger velocities along the coast. Again, the inland extent and characteristics of the afternoon coastal mixing layer are uncertain. The coastal plain of the San Diego Air Basin is

not as wide as in the South Coast Air Basin. Otherwise, similarities in air pollution potential could be expected due to accumulation opportunities in the morning and restricted vertical mixing in the afternoon.

5. Salinas Valley - Low coastal mixing heights are present at the northwestern end of the Salinas Valley. Downwind, to the southeast, the mixing layer increases in height with increased surface temperatures. The characteristics of the mixing layer variations downwind are not well documented.

5.7 Episodes

Holzworth (1972) defined episodes of high potential by the continuous occurrence of various ranges of wind speed and mixing height. For example, a class of episodes was described by successive sounding measurements of <2 m/sec and mixing heights of 1000 m or less over a period of 2 or 5 days. A matrix of wind speeds from 2-6 m/s and from 500 to 2000 m was used in the study. A similar analysis of episodes was not possible within the limitations of the present study since the aircraft sounding data tend to be intermittent and continuous daily records were frequently not available.

Another perspective on episodes can be obtained from the 850 mb temperature records. The occurrence of warm temperatures aloft can be construed as episode conditions, given the relationships between 850 mb temperatures and peak ozone concentrations presented earlier. For the purposes of the present definition the occurrence of an 850 mb temperature at least 3^{o} C above normal was considered to be an indication of an episode day. Table 5-13 gives the yearly distribution of episode durations for the July - September period at Vandenberg AFB and Oakland.

Table 5-13

Yearly Frequency of Episode Durations
(Four Year Average)
(July - September)

	No. of Occurrences	
Duration	Vandenberg AFB	Oakland
1 day	2.7	1.2
2	1.0	1.0
3	1.0	0.7
4	0.5	0.7
5	0.5	0.2
6	0	0.5
>6	1.5	0.7
Total number of days	26.5	21.7

The numbers given in Table 5-13 are not directly comparable to the values presented by Holzworth (1972) since Holzworth tabulated episode periods for the entire year. As a rough guide, however, the numbers in the table probably correspond approximately to Holzworth's category of <500 m mixing height and <4 m/s average wind speed. This suggests that the data in the table reflect a rather stringent definition of an episode.

6.0 SPECIAL TOPICS

There are a number of regional meteorological patterns which are characteristic of portions of California and which strongly influence the air pollution potential in certain areas. Some of the more important of these are described below.

6.1 Eddy Structures

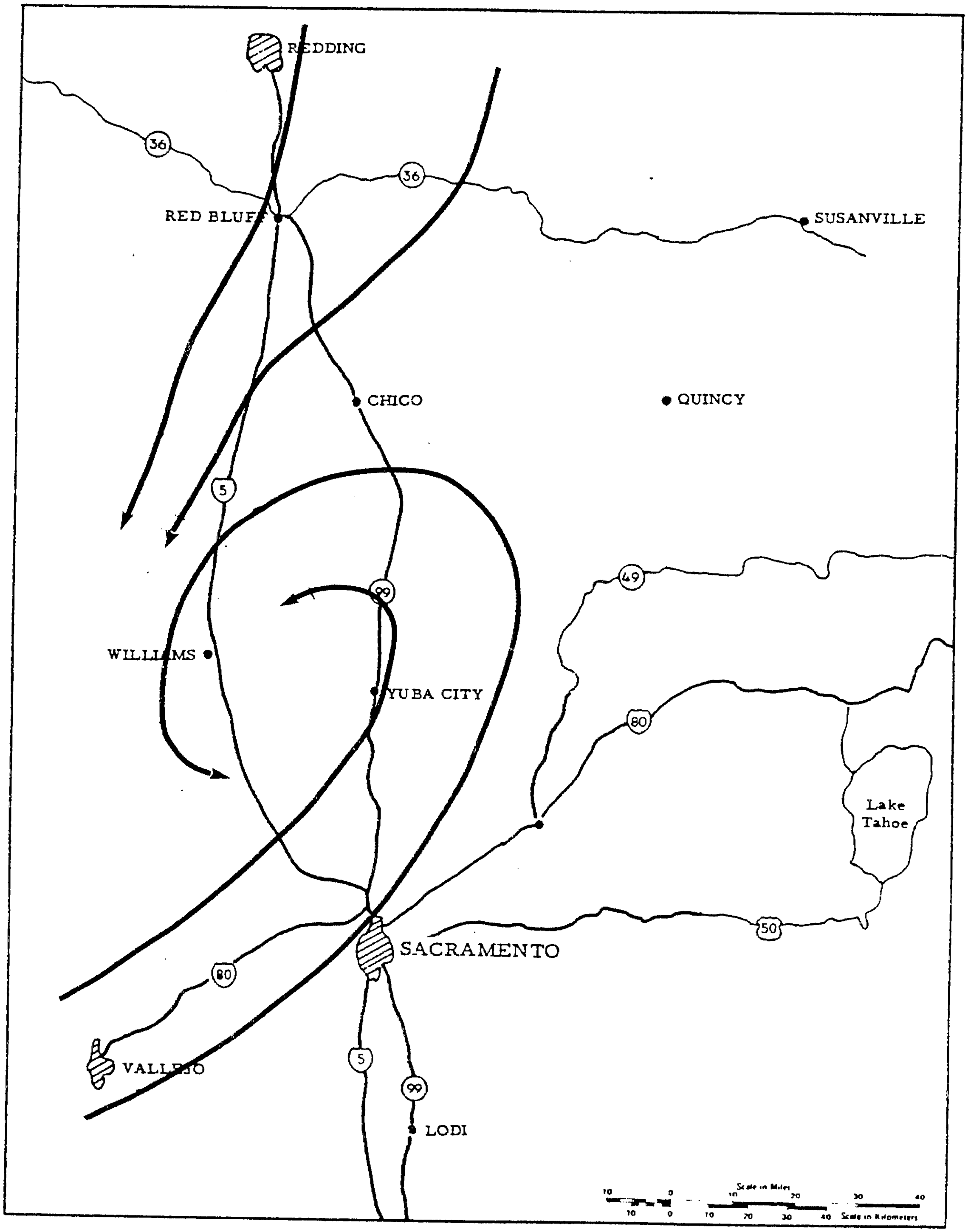
There are at least three areas in California where horizontal eddy circulations are occasionally established with diameters of the order of 100-200 miles. The cause of these eddies is basically the same at each location.

Schultz Eddy

The Schultz Eddy occurs in the southern half of the Sacramento Valley and was first described by Schultz (1975). Fitzwater (1981) performed a field study which further documented the flow pattern.

During the summer afternoons in the Sacramento Valley the onshore pressure gradient drives marine air through the Delta area with one branch turning north into the Sacramento Valley. Southerly winds characterize the flow pattern throughout the valley. At night the winds in the northern part of the valley become northerly in response to drainage influences, possibly supplemented by synoptic pressure gradients. The opposing flows generally converge between Red Bluff and Chico (Unger, 1979). Near daybreak, a counterclockwise eddy develops in the southern half of the valley which persists until around noon. This eddy structure is shown schematically in Fig. 6-1. During the early afternoon the diurnal onshore pressure gradient turns the winds in the valley to southerly and the eddy structure is dissipated. From the available data the eddy is present within the lowest 600 m and has its peak development about 07-09 PDT. There are indications that the eddy occurs on about 60-70% of the days in summer. On non-eddy days a strong southerly flow tends to dominate throughout the valley.

The driving force behind the formation of the Schultz Eddy is the onshore pressure gradient which causes south to southwesterly winds in the southern part of the valley at all hours of the day. When these gradient-driven winds



80-058

SCHEMATIC VIEW OF SCHULTZ EDDY-06 PST

Fig. 6-1

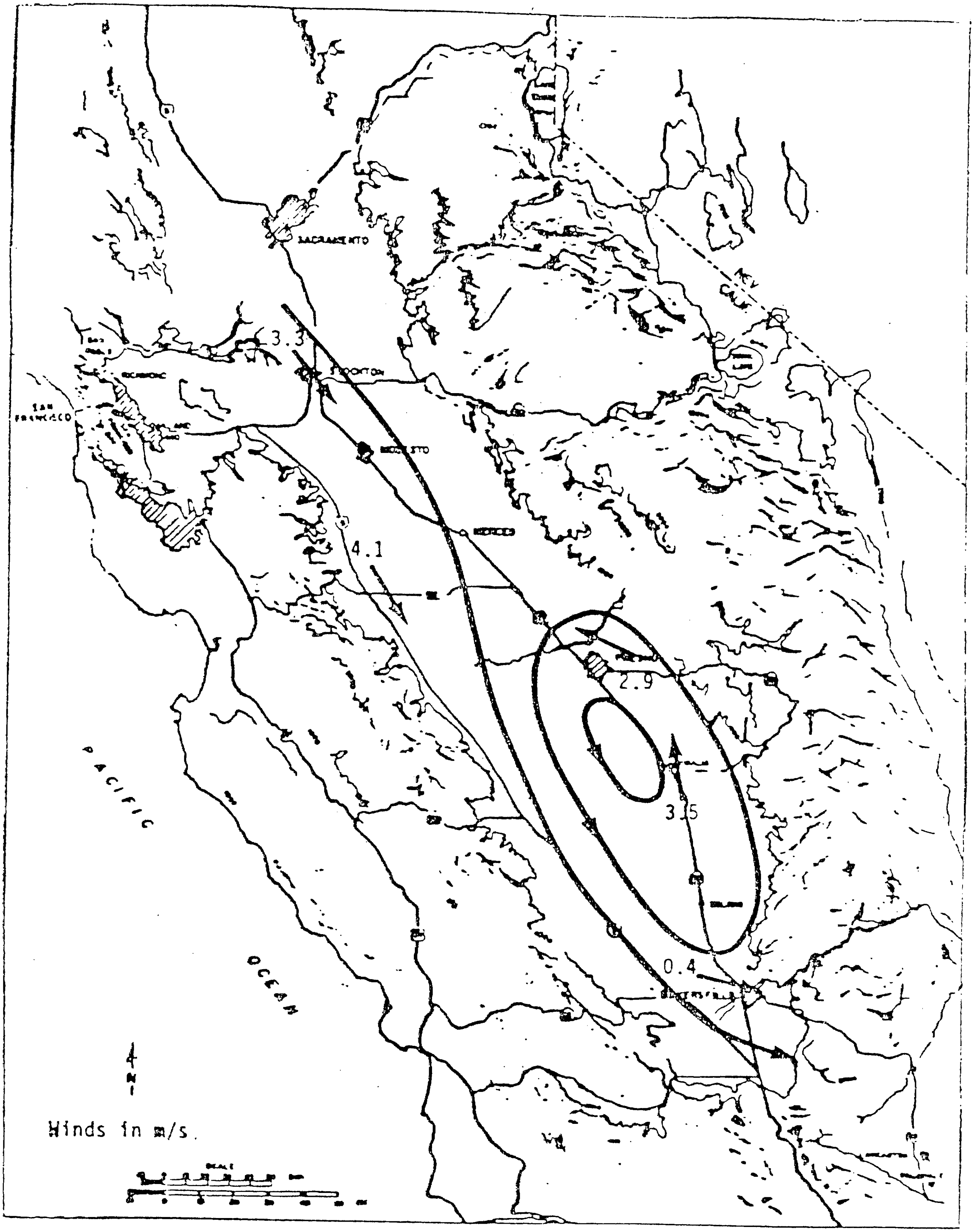
encounter an obstacle (in this case the northerly wind from from the north Sacramento Valley), the southerly winds are deflected into a counterclockwise flow pattern.

The Schultz eddy tends to recirculate pollutants in the southern part of the Sacramento Valley which might otherwise be transported into the northern part of the valley. This recirculation occurs only during the early morning hours and is terminated by late forenoon.

Fresno Eddy

A similar phenomenon exists in the southern part of the San Joaquin Valley in summer. The pressure gradients from the coast to the interior generate northwesterly winds in the valley at all hours of the day. From 10 to 20 PDT this northwesterly flow passes through the southern part of the valley, exiting over the Tehachapi Mts. to the southeast of Bakersfield. During the early evening the lower layers of air in the southern part of the valley begin to stabilize to the extent that the low-level air can no longer be lifted over the mountain ridges. The northwesterly winds which continue to be driven by pressure gradient forces throughout the night, are consequently deflected into a counterclockwise flow pattern. This pattern starts in a minor way near Bakersfield in the early evening but gradually spreads northward and grows in diameter until it frequently results in southeasterly winds aloft at Fresno by 09 PDT on the following morning. The existence of the pattern was first observed in the upper level winds at Fresno. As a result, the pattern became known as the "Fresno Eddy".

The eddy is caused by the blockage of the northwesterly flow by the terrain in the southern part of the valley. The height of this terrain (3000-4000 ft.) therefore controls the depth of the eddy. Further details on the development of the eddy are given in Smith et al (1981). An example of the Fresno Eddy is shown in Fig. 6-2. The reference study found that the frequency of occurrence of the eddy was 75-80% during the summer and early fall. The eddy tends to recirculate pollutants from the southern part of the valley back towards the north along the east side of the valley.



FRESNO EDDY - JULY AVERAGE WINDS AT 1000 FT (09 PDT)

Fig. 6-2

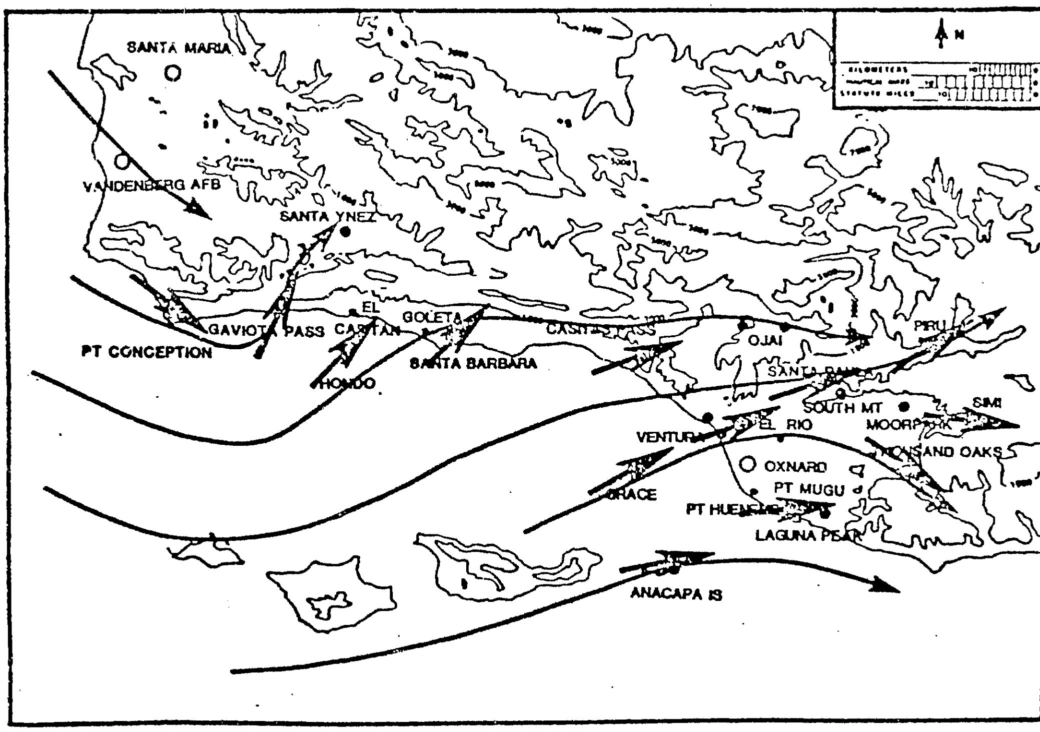
Santa Barbara Eddy

The same type of dynamic flow pattern also exists under certain conditions in the Santa Barbara Channel.

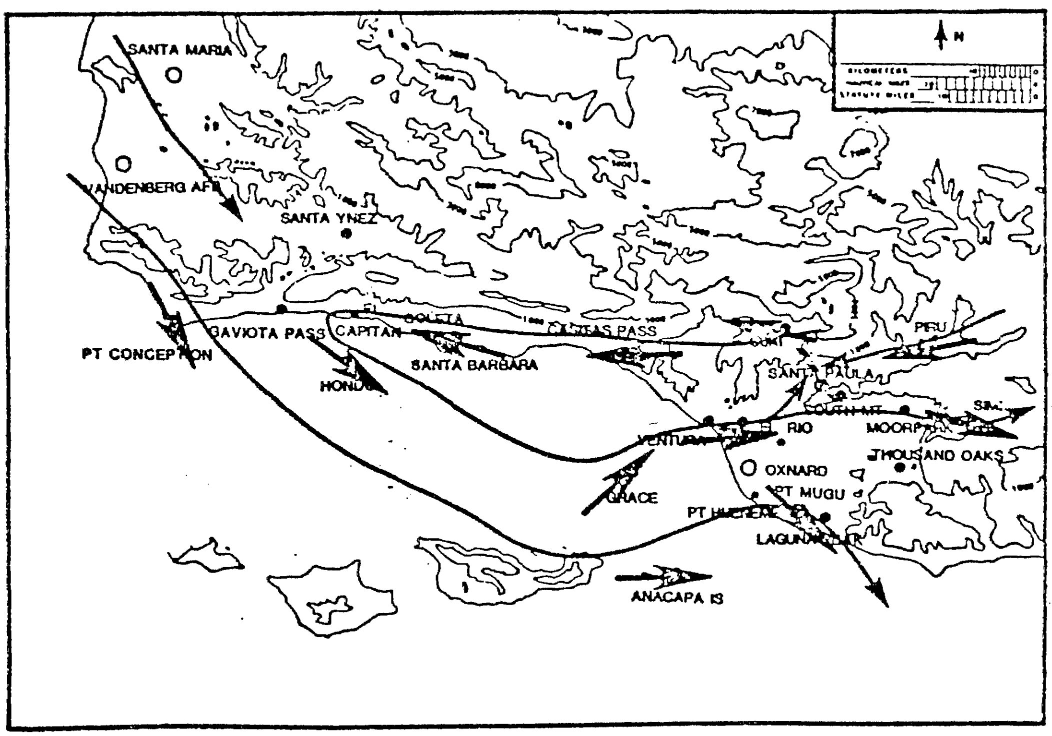
Fig. 6-3 shows streamline patterns in the channel obtained during a CARB field program in 1980 (Smith et al, 1983b). At 15 PDT the flow through the channel is generally from a westerly direction exiting up the eastern slopes of Santa Barbara and Ventura County. By evening the slopes begin to cool, resulting in an opposing drainage flow and stabilizing the lower layers so that air flow from the channel can no longer pass over the ridges to the east. As was the case in the previous areas the pressure-gradient flow continues offshore during the night but is deflected into a counterclockwise pattern. The beginning of this pattern is shown in Fig. 6-3. A similar and better developed eddy pattern continues through most of the morning on the following day.

As described in the San Joaquin Valley the terrain provides a blockage to the flow which must be diverted away from the terrain. In this case the terrain to the north and east of the channel is about 3000-4000 ft. so this represents the top of the eddy structure. The strongest eddy development occurs when warm temperatures aloft enhance the vertical stability and contribute to enhanced deflection. The importance of the Santa Barbara Eddy is that pollutants produced in the coastal regions can be recirculated offshore during the night where they may be brought back onshore by the afternoon sea breeze. It appears that successive days of this pattern can result in a gradual build-up of pollutants in a "reservoir" manner which eventually are transported onshore at the end of the episode period.

September 1980 Field Program



15 PDT



21 PDT

FORMATION OF THE SANTA BARBARA EDDY

Fig. 6-3

6.2 Slope Flows

Some of the principal air basins in California (Sacramento, San Joaquin, North Central Coast, South Central Coast, South Coast and San Diego) are bordered by significant mountain ridges. When appropriately located, the slopes may be heated, resulting in the generation of a significant transport of air upslope. In the areas affected by the summer marine inversion the upslope flow provides a mechanism for the transport of pollutants from below the inversion to above. In areas such as the South Coast Air Basin this transport provides one of the the more effective methods of removing pollutants from the Basin.

In areas which are immediately downwind of significant emission sources the upslope flow may transport ozone and other pollutants to high elevations in the mountain areas. Lake Gregory in the San Bernardino Mts. (elev. 4500 ft.) is immediately downwind of the San Bernardino area and frequently reports ozone values as high or higher than any in the South Coast Air Basin. Ozone scavenging by fresh emissions of nitric oxide is generally low in mountainous areas and ozone development may continue well beyond the boundary of the emission regions. Mt. Baldy and Mt. Wilson in the San Gabriel Mts. also experience high ozone concentrations as a result of the upslope flow (Smith et al, 1983a).

Similar problems exist in the Sierra Nevada Mts. to the east of Fresno, Bakersfield and Sacramento. Miller, McCutchan and Milligan (1972) and Williams, Brady and Willson (1977) have documented high ozone concentrations in the Sequoia National Forest and have attributed these to the urban area of Fresno. Unger (1978) and Duckworth and Crowe (1979) have described the impact of the Sacramento urban sources on the Sierra Nevada slopes to the northeast of Sacramento.

Recent aircraft lidar observations in the South Coast and San Diego Air Basins (McElroy et al, 1982 and 1983) have provided a clear visualization of this upslope flow. In some cases the upslope flow becomes convective and is transported to levels above the mountain ridge by these motions. In other cases, the upward transport is limited by the stability of the air layers aloft. In such cases, a layer aloft forms as discussed in the next section. Smith and Edinger (1984) show several examples of the upslope flow as obtained by the lidar data.

6.3 Layers Aloft

The unique combination of terrain and meteorological conditions in California contribute to a high frequency of pollution layers aloft. Smith et al (1976) indicate that some type of layer aloft was observed in a great majority of their aircraft spirals. Similar layers are observed in many other parts of the state.

There are a number of different mechanisms for producing such layers:

1. Upslope Flow - As described in the previous section, upslope flow transports pollutants to elevations above the top of the mixed layer from which the pollutants originated. Given a strong stable layer in the inversion the pollutants flatten out into a layer aloft which is then transported by the winds within the inversion layer. Under strong and low inversion conditions the winds in this layer are frequently from an easterly direction which tends to bring the layer back over the air basin which originally generated the pollutants. At other times, the flow aloft may carry the layer eastward and into a new air basin.

Such layers have been observed in the South Coast, San Diego, South Central Coast. San Joaquin Valley, Southeast Desert, San Francisco Bay, North Central Coast and over the near-offshore coastal waters. The altitude of the layers is somewhat dependent on the height of the nearby terrain which helps to generate the layers. The layer altitudes appear to be lower in the South Central Coast Air Basin and higher in the South Coast and San Joaquin Valley Air Basins.

2. Convergence Areas - In some areas of the state, surface wind patterns converge and pollutants from the surface layers are transported aloft. This process is described further in a later section.

3. Marine Air Intrusion - Along the immediate coast a marine layer often undercuts the coastal pollutant layer bringing cleaner air to the surface layers but leaving a pollutant layer aloft. This mechanism is described in more detail in a later section.

4. Transport into the Stable Layer - Active vertical mixing in the mixed layer during the afternoon transports pollutants into the inversion layer, primarily by convective processes. As soon as the surface temperatures begin to decrease and the convective action becomes somewhat less vigorous, the pollutants in the inversion layer become separated from the lower levels and become a layer aloft.

5. Plumes from Stationary Sources - Heated, isolated sources frequently deliver plumes into the inversion layer where they may become separated from the mixed layer and constitute a layer aloft.

The importance of the layers aloft lies in the potential for mixing downward on the same day or the following day as the surface-based mixing layer grows upward due to surface heating. This process has been observed in the South Central Coast Air Basin (Smith et al, 1983) and in the Sacramento Valley (Lehrman et al, 1981). However, little is known at present about the impact of these layers on surface concentrations. Some of the most significant impact may occur in the South Central Coast Air Basin where the layers tend to be rather low and an accumulation of pollutants aloft seems to take place offshore during episode periods.

Further observational information on the presence of layers aloft is contained in:

<u>South Coast Air Basin</u>
Smith et al (1976), McElroy (1982) and Smith and Edinger (1984).

<u>San Diego Air Basin</u>
McElroy (1983)

<u>South Central Coast Air Basin</u>
Lea (1968), Kauper and Niemann (1975), Smith et al (1983b) and McElroy (1984)

<u>San Joaquin Valley Air Basin</u>
Unger (1977) and Smith et al (1981)

<u>Sacramento Valley Air Basin</u>
Lehrman et al (1981)

<u>Southeast Desert Air Basin</u>
Smith et al (1983a) and McElroy (1982)

<u>San Francisco Bay Air Basin</u>
Miller and Ahrens (1970) and MacKay (1977)

<u>North Central Coast Air Basin</u>
Dabberdt (1983)

6.4 Convergence Zones

There are several areas in the state where terrain and pressure-gradient characteristics combine to produce surface, convergent wind flow patterns. The most important of these are described below and are shown in Fig. 6-4:

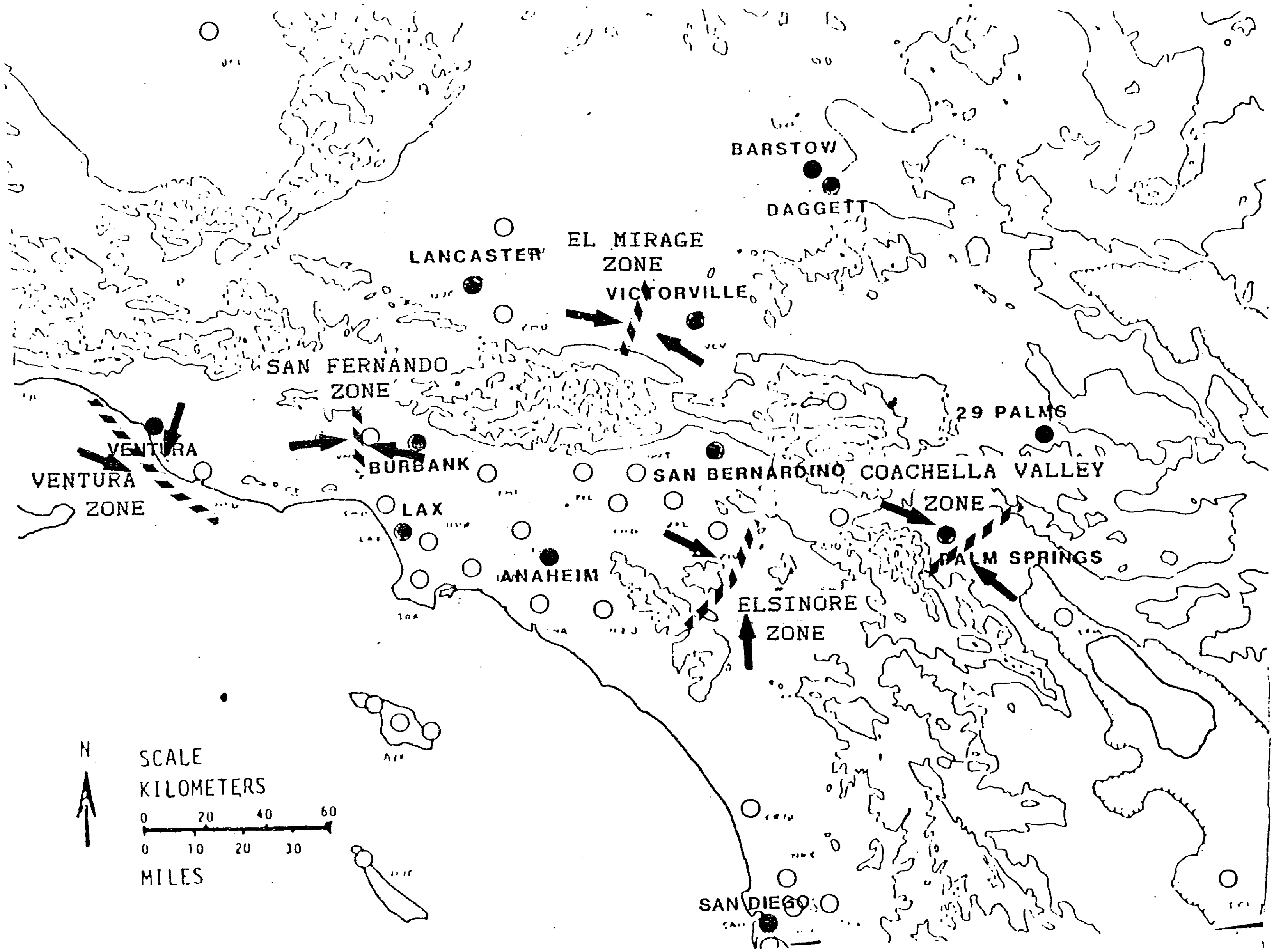
1. Elsinore Zone - During the afternoon on most summer days a flow from the northwest through Riverside meets a flow from the southwest through southern Orange County in the convergent line near Elsinore and Hemet. The zone is a favorite location for soaring pilots who utilize the upward currents in the zone. McElroy (1982) provided lidar cross sections of the zone on two days in 1981. These data were further analyzed by Smith and Edinger (1984).

2. San Fernando Valley Zone - Convergence of an easterly flow through the San Fernando Valley with a sea breeze flow from Ventura County results in the San Fernando Valley Zone (Edinger and Helvey, 1961). The zone generally forms in the western end of the San Fernando Valley as air from Ventura County penetrates into the valley. The zone tends to move eastward during the afternoon.

3. El Mirage Zone - A zone of convergence frequently exists in the afternoon between an air trajectory through Soledad Canyon moving east and one through Cajon Pass which spreads out to the west. These trajectories meet in the general area of El Mirage where soaring pilots have also utilized the resulting upward currents.

4. Coachella Valley Zone - During the summer the typical daytime air flow in the Imperial and Coachella Valleys is from the southeast, aided by a monsoon pattern which dominates the southwestern U.S. In the late afternoon a flow of pollutants from the South Coast Air Basin passes through San Gorgonio Pass and moves to the southeast. The two opposing flows create a convergent zone which moves to the southeast during the evening.

5. Ventura Zone - Another zone of some importance in the South Central Coast Air Basin exists during the night between westerly flow in the Santa Barbara channel and easterly flow (drainage) from the eastern part of Ventura County. This zone appears to exist through most of the night and serves to keep offshore air parcels from moving onshore in Ventura County during the night.



LOCATIONS OF CONVERGENCE ZONES

Fig. 6-4

There are undoubtedly other such zones in the state which have not been documented. The importance of the zones is twofold:

1. They serve to restrict the flow of pollutants from one portion of a basin to another.

2. The zones serve as a mechanism for transporting pollutants from the surface layers to the upper levels where they may be carried away by the upper air winds. The Elsinore Zone, in particular, appears to be a major source of such upward transport.

6.5 Mixing Layer Structure in the Coastal Areas

6.5.1 Impact of Surface Heating

Under meteorological conditions of pollutant interest there is typically a strong surface temperature gradient directed from the immediate coast to the inland areas of California. Maximum surface temperatures between LAX and San Bernardino in summer, for example, differ by over 20°F. These temperature differences lead to variations in the depth of the mixed layer as a function of distance from the coast.

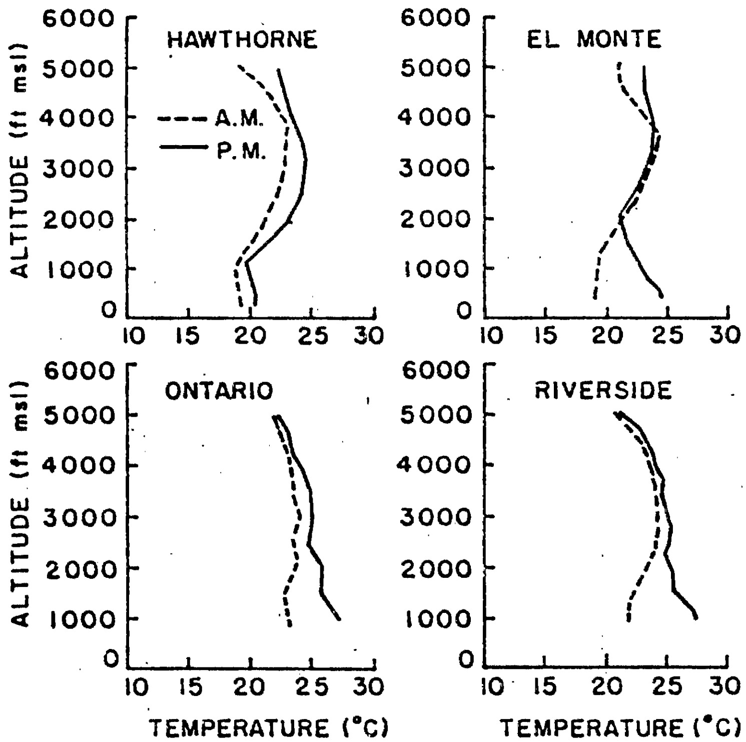
Fig. 6-5 was taken from a paper by Husar et al (1977). The data consist of mean temperature and turbulence soundings made on 24 pollution days in 1972-73 during a CARB-sponsored study of the South Coast Air Basin. Soundings at four locations from Hawthorne to Riverside were analyzed. Fig. 6-5(a) shows the mean morning and afternoon temperature soundings at each location. The height of the temperature inversion remains nearly constant at Hawthorne from morning to afternoon but increases markedly in the afternoon in the inland areas. Both Ontario and Riverside show slightly higher inversions than El Monte in accordance with the increased surface heating inland. Fig. 6-5(b) shows the mean turbulence values at the same locations and serves to illustrate the changes in mixing characteristics as a result of the surface heating.

The increased afternoon mixing layer depths as a function of distance from the coast have several important effects on pollutant concentrations:

1) The increased depth permits increased dilution in the pollutant concentrations which are frequently generated by morning emissions and then transported downwind to areas further inland.

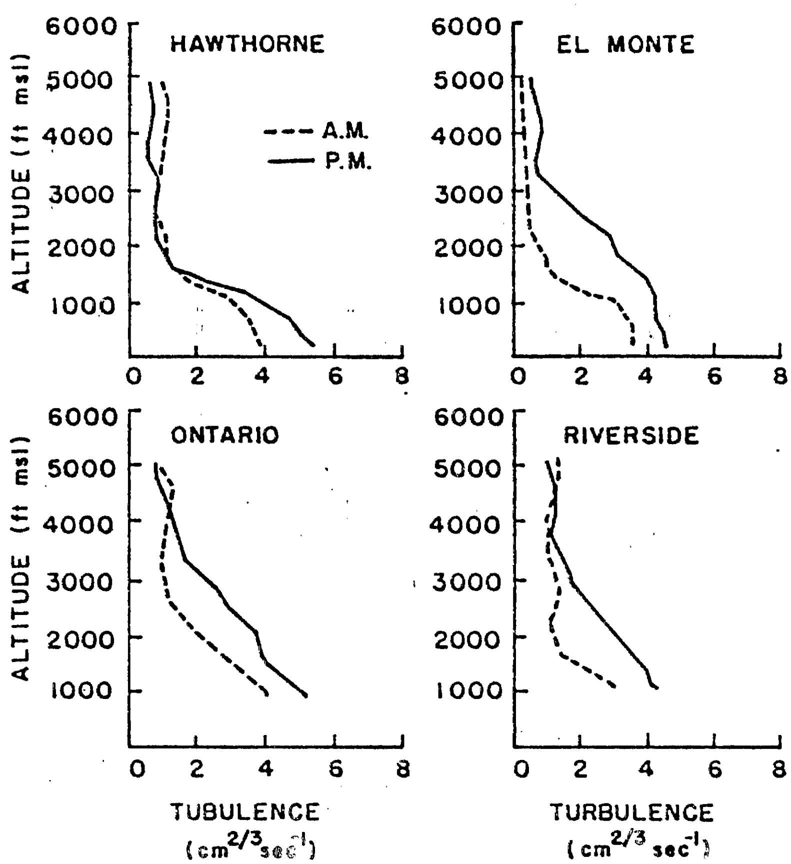
2) The increased depth may incorporate into the mixed layer pollutants aloft which may have resulted from elevated plumes from layers left over from the previous day.

3) Pollutants from elevated sources near the coast may not be brought downward into the surface layers (if at all) for a considerable distance downwind but may be brought downward more rapidly in the inland areas.



a. Temperature Profiles

(after Husar et al,1977)



b. Turbulence Profiles

Fig. 6-5 VARIATIONS IN MIXING HEIGHTS IN SOUTH COAST BASIN

6.5.2 Marine Air Intrusions

The proximity of the ocean to many of the principal emission sources in California has a pronounced effect on the pollutant distribution. A cool layer of air which has come into equilibrium with ocean surface temperatures begins to move inland during the forenoon. Ahead of the marine air may be sizeable concentrations of pollutants which have accumulated during the stagnant wind conditions of the night and early forenoon. These concentrations begin to move inland ahead of the marine air. The sea breeze air moves inland rapidly enough so that accumulations of new pollutants in the marine air are minimized. Thus the high concentrations inland occur ahead of the marine air intrusion.

This is the typical summer sequence in the South Coast Air Basin. The process is illustrated in Fig. 6-6 which shows a series of helicopter temperature soundings made at a helicopter site about 4 miles east of downtown Los Angeles (Hopper, 1967). The sequence shows 1) the increased mixing depth resulting from surface heating, 2) elimination of the inversion at 1540 and 3) a low-level intrusion by 1740 PST.

Fig. 6-7 shows a cross section of b_{scat} from Santa Monica to Redlands (Smith et al, 1976) during the late afternoon. The highest pollutant concentrations have reached Upland (CAB) by 17 PDT and are followed by much cleaner air to the west. Note that the marine air undercuts the pollution leaving a layer aloft.

The most prominent manifestation of the process shown in Fig. 6-7 is the rapid improvement in visibility within the marine air. Table 6-1 shows the median time of visibility improvement for several locations in the South Coast Air Basin.

Table 6-1

Marine Air Intrusions in South Coast Air Basin
(July - August)

Location	Median Time for Visibility Improvement
LAX	13 PST
El Monte	17
Ontario	19
Norton AFB	19

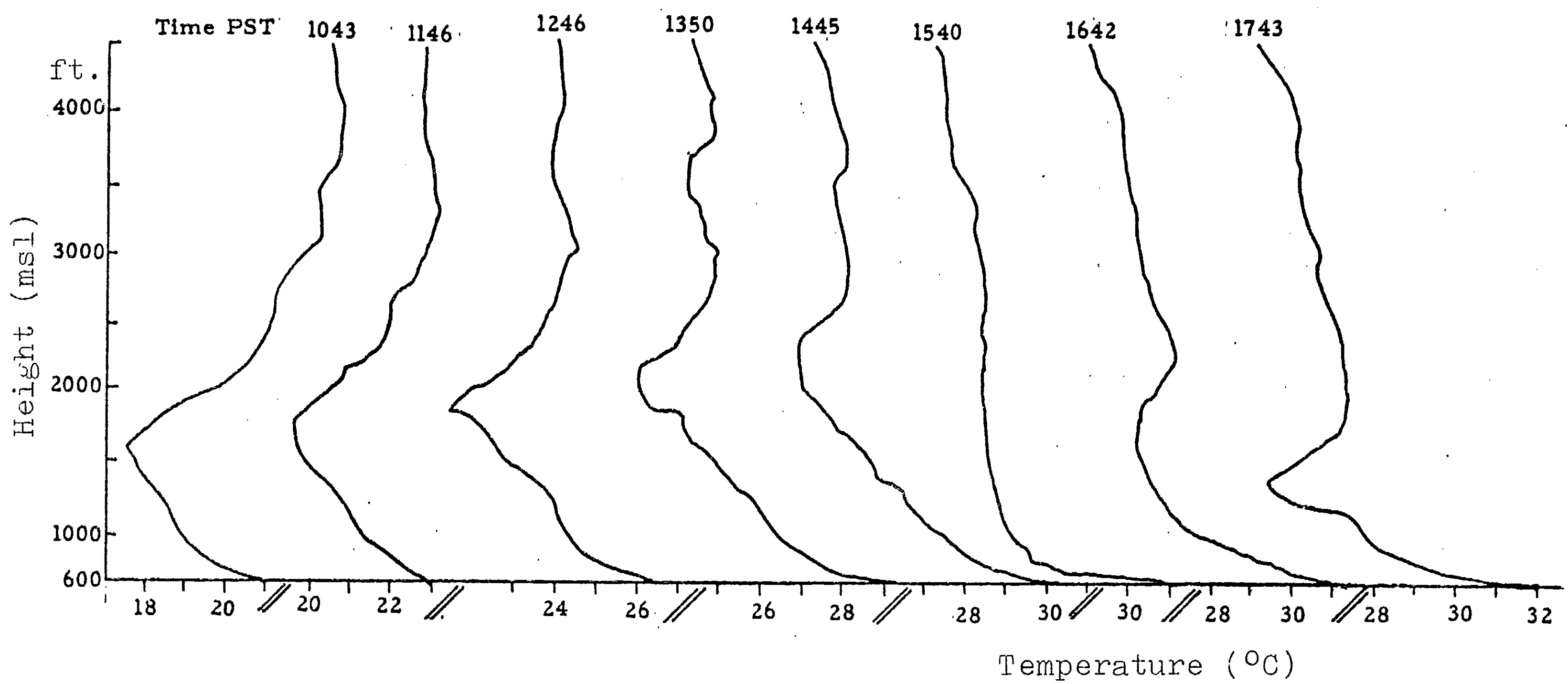
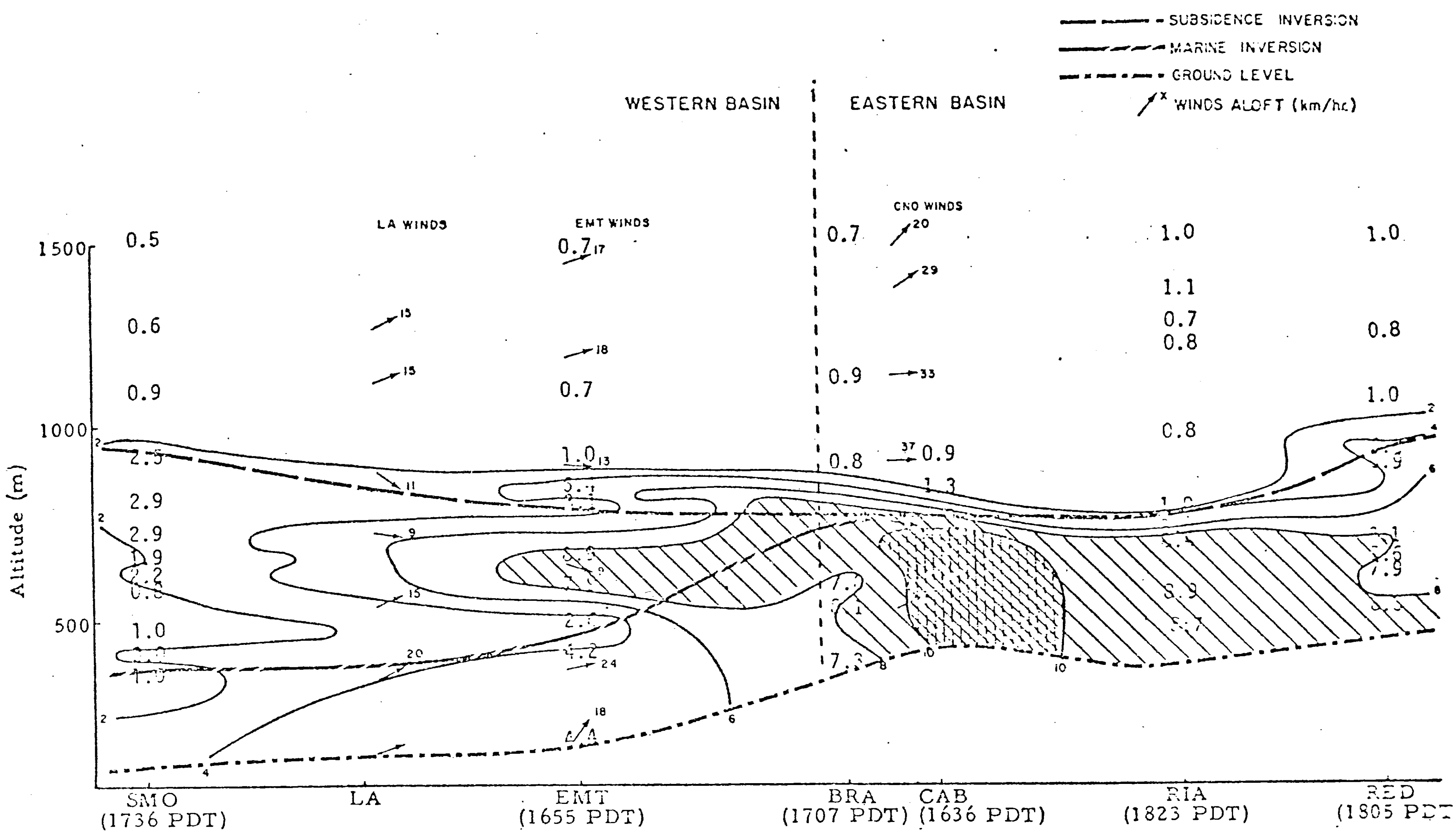


Fig. 6-6 TIME HISTORY OF TEMPERATURE PROFILES - EAST LOS ANGELES
July 6,1962

(after Hopper,1967)



VERTICAL CROSS SECTION OF b_{scat} FOR AFTERNOON OF JULY 25, 1973 (Units are 10^{-4} m^{-1})

Fig. 6-7

The indicated times represent the first hourly observation which shows a marked improvement in visibility.

Similar developments occur in other areas of southern California. At San Diego (airport) the median time for an indication of the visibility improvement is 11 PST and 13 PST at Gillespie Field which is approximately 10 miles inland.

In the South Central Coast Air Basin Oxnard shows a median time of 13 PST. Farther inland, Piru and Simi frequently exhibit double peaks in the diurnal trend of ozone concentrations. Smith et al (1983b) have suggested that the second peak (around 16 PDT at Piru) is associated with the influx of marine air. In this case the offshore area experiences high ozone concentrations due to recirculation so that the marine influx brings in new concentrations of ozone.

Fosberg and Schroeder (1966) have described the penetration of marine air into Central California on a case study basis. Due to the unique terrain features around the Bay Area the penetration occurs more readily through the Carquinez Straits into the Delta area. The sea breeze front appears to reach Sacramento some time after 14 PST but is delayed in the regions north and south of the Bay Area. Miller and Ahrens (1970) show an example of marine air reaching Livermore about 16 PST with a vertical ozone cross section similar to that shown in Fig. 6-7.

The marine air intrusion is characterized by a cool, shallow layer which maintains its integrity for a considerable distance inland in spite of the surface heating it encounters. In most areas the offshore air which is transported inland has much lower pollutant concentrations than the inland air it displaces. In the South Central Coast Air Basin, however, there are occasionally sufficient concentrations offshore so that the marine air brings in pollutant concentrations which may be even higher than in the air preceding the intrusion.

7. CONCLUSIONS

1. There are frequent occurrences of calm winds (less than 3 knots) throughout the state at the 10th percentile limit. These conditions permit the accumulation of pollutant concentrations with reduced dilution.

2. Terrain exerts a strong control over wind flow patterns in the state, particularly during the summer. In Central California a major terrain feature at the Carquinez Straits permits air to pass from the coastal regions into the interior valley. In the south the major openings are several passes from the South Central Coast, South Coast and San Diego Air Basins. In the balance of the state flow from the coastal area is blocked by the coastal mountain range.

3. Interbasin transport has been documented between the following air basins:

   a. San Francisco Bay to Sacramento Valley and the North Central Coast Air Basin
   b. Sacramento Valley to the Mountain Counties Air Basin
   c. San Joaquin Valley to the Southeast Desert Air Basin
   d. South Central Coast to South Coast Air Basin
   e. South Coast to South Central Coast, San Diego and Southeast Desert Air Basins
   f. San Diego to Southeast Desert Air Basin.

4. Air pollution estimates can be formulated from a variety of parameters or combinations of parameters:

   a. 850 mb Temperature
   b. Holzworth Potential
   c. Ventilation Factor (defined as mixing height times wind speed)
   d. Maximum Surface Temperature
   e. Low morning wind speeds
   f. Low mixing heights

Evaluating these parameters against peak daily ozone concentrations, the highest correlations were obtained through the use of surface maximum temperatures. These proved to be slightly better than the 850 mb temperature. Correlations using the ventilation factor were lower and less consistent than with the temperature relationships.

Use of the Holzworth potential produced the lowest correlations and the least consistent values. It is suggested that the use of both ventilation and the Holzworth potential suffer from the difficulties in estimating mixing heights.

5. Time of ozone maximum vs. time of peak temperature at the same location yields useful information on receptor/source areas. Source areas tend to have an ozone maximum before the surface temperature maximum while receptor areas have later ozone maxima with respect to the temperature maximum.

6. Average wind speeds (average of 07 and 10 PDT) were used to estimate the areas of the state where accumulation of pollutants during the morning was most favored. These areas turned out to be Ukiah/Santa Rosa; the Mojave Desert (Edwards, Inyokern) and the San Bernardino/March Field area. Although low wind speeds are not accurately measured these areas all appeared to have average wind speeds of 1.5 knots or less during the morning hours on a median basis.

7. Several flow patterns which are characteristic of California air pollution meteorology are described. These are:

a. Eddy Structures - Horizontal eddies of the order of 100 - 200 miles in diameter develop in at least three areas of the state (southern Sacramento Valley, San Joaquin Valley and the Santa Barbara Channel. These eddies form as the result of blocking of the flow by terrain or opposing winds. They serve to redistribute the pollutants in the lower layers over the horizontal extent of the eddy.

b. Slope Flows - Heated slopes during the afternoon produce upslope flow which transports pollutants from the mixed layer to levels above the mixed layer. The mechanism is effective in most parts of the state but is probably most significant along the southern slopes of the San Gabriel and San Bernardino Mts. in the South Coast Air Basin. High ozone concentrations have been observed at Lake Gregory, Mt. Baldy and Mt. Wilson.

c. Layers Aloft - Pollutant layers aloft form as a result of several different processes, upslope flow being one of the most productive methods. The layers are separated from the surface during a part of their lifetime. In the afternoon they may be incorporated into the mixing layer and bring additional pollutants to the surface. The layers have been observed in many parts of the state but may be most significant in the South Central Coast Air Basin where their altitudes tend to be somewhat lower.

d. Convergence Zones - Terrain and regional pressure gradients combine to produce areas where the surface wind flows converge. The most significant of these are the Elsinore and San Fernando Valley Zones although others exist in the state. The zones prevent pollutant material from being transported into certain areas and generate an area of upward currents that remove pollutants from the surface layer.

e. Variations in Coastal Mixing Heights - Maximum surface temperatures increase markedly between the coast and the inland areas (e.g. over 20°F increase from LAX to San Bernardino). These high inland surface temperatures serve to raise the mixing layer depth and dilute the pollutant concentrations within the layer.

The sea breeze flow, beginning in the morning, transports a shallow layer of cooler air inland during the afternoon. The layer generally undercuts the existing mixing layer and creates a layer aloft out of the top of the existing mixed layer. In most areas the marine air intrusion brings cleaner air from offshore which results in a marked improvement in visibility. In the South Central or South Coast Air Basins the layer may bring in recirculated pollutants from offshore which contribute to a second peak in ozone concentrations in the inland areas.

8. The primary source of uncertainty in defining meteorological air pollution potential in the state lies in the descritpion of mixing height behavior, particularly in the coastal areas where mixing height changes significantly with distance inland. Areas where better mixing height statistics are needed are Santa Rosa, the Salinas Valley, the southern portion of the San Francisco Bay Basin, San Bernardino/Riverside and the inland areas of the San Diego Air Basin.

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APPENDIX

Data Summaries

METEOROLOGICAL PARAMETERS

	PST	T °F 50%	T °F 90%	REL HUM % 50%	REL HUM % 90%	WIND SPEED KNOTS 50%	WIND SPEED KNOTS 10%	MOST FREQ W/D DEG	N
ARCATA									
JAN	08	39	51	94	100	4	0	C	62
	12	51	58	71	98	5	0	C	
	16	51	56	77	97	7	0	350	
APR	08	49	55	90	100	4	0	C	60
	12	55	60	78	94	7	4	320	
	16	54	60	75	94	9	4	330	
JULY	08	55	61	93	100	3	0	C	62
	12	61	65	75	85	7	4	350	
	16	61	67	76	83	7	4	340	
OCT	08	53	57	97	100	0	0	C	62
	12	60	67	77	98	5	0	320	
	16	59	66	75	97	5	2	340	
UKIAH									
JAN	08	40	52	98	100	0	0	C	62
	12	51	59	69	96	0	0	C	
	16	55	65	62	92	0	0	C	
APR	08	50	56	79	92	0	0	C	60
	12	64	75	47	67	6	0	C	
	16	66	79	43	76	8	4	300	
JULY	08	68	75	61	73	0	0	C	62
	12	88	98	31	43	5	0	C	
	16	92	103	28	43	9	6	270	
OCT	08	54	63	84	99	0	0	C	62
	12	68	87	48	87	0	0	C	
	16	71	94	42	87	6	0	C	

METEOROLOGICAL PARAMETERS

	PST	T ^{O}F 50%	T ^{O}F 90%	REL HUM % 50%	REL HUM % 90%	WIND SPEED KNOTS 50%	WIND SPEED KNOTS 10%	MOST FREQ W/D DEG	N
MARYSVILLE									
JAN	08	42	54	96	100	5	0	C	62
	12	51	58	83	99	6	2	160	
	16	54	61	75	98	6	0	180	
APR	08.	55	62	76	93	7	0	C	60
	12	66	77	55	72	7	3	180	
	16	69	82	44	81	8	3	160	
JULY	08	74	85	53	70	7	0	140	62
	12	89	99	34	46	7	4	140	
	16	95	106	24	38	7	4	220	
OCT	08	59	71	79	94	5	0	C	62
	12	74	91	44	64	6	3	140	
	16	77	97	37	59	5	0	C	
RED BLUFF									
JAN	08	42	52	86	99	6	2	350	62
	12	52	61	64	95	7	3	350	
	16	55	65	56	94	6	0	C	
APR	08	56	62	70	86	7	2	360	60
	12	67	76	43	64	7	2	150	
	16	71	81	39	64	8	3	170	
JULY	08	78	87	43	61	6	3	360	62
	12	94	103	26	41	7	3	170	
	16	98	109	21	32	10	5	150	
OCT	08	60	73	67	87	5	0	340	62
	12	73	94	40	80	5	0	360	
	16	76	101	33	76	6	3	170	

METEOROLOGICAL PARAMETERS

	PST	T °F	T °F	REL HUM %	REL HUM %	WIND SPEED KNOTS	WIND SPEED KNOTS	MOST FREQ W/D DEG	N
		50%	90%	50%	90%	50%	10%		
					SACRAMENTO				
JAN	08	42	53	94	100	5	2	320	62
	12	50	55	81	97	6	2	160	
	16	53	59	75	94	7	3	160	
APR	08	55	61	72	83	6	2	160	60
	12	67	76	49	76	7	2	320	
	16	69	80	41	72	8	3	220	
JULY	08	67	78	65	76	6	2	180	62
	12	86	96	37	49	7	3	210	
	16	93	103	26	42	8	3	220	
OCT	08	57	67	80	93	4	0	C	62
	12	72	87	44	65	6	3	340	
	16	75	95	36	59	6	2	210	

METEOROLOGICAL PARAMETERS

	PST	T °F	T °F	REL HUM %	%	WIND SPEED KNOTS		MOST FREQ W/D DEG	N
		50%	90%	50%	90%	50%	10%		
ALAMEDA									
JAN	08	47	55	98	100	3	0	C	62
	12	52	59	87	100	5	0	330	
	16	55	60	81	100	5	0	C	
APR	08	56	60	82	94	4	0	C	60
	12	61	67	69	96	7	3	260	
	16	61	68	68	80	12	6	270	
JULY	08	61	67	80	91	4	0	270	62
	12	68	77	62	75	8	4	270	
	16	67	75	64	75	11	6	270	
OCT	08	59	66	80	91	3	0	C	62
	12	68	74	60	73	5	2	270	
	16	67	74	62	72	9	4	270	
CONCORD									
JAN	08					3	0	C	62
	12					6	0	C	
	16					6	0	C	
APR	08					6	0	190	60
	12					8	2	340	
	16					10	5	290	
JULY	08					7	0	200	62
	12					9	5	320	
	16					11	8	260	
OCT	08					4	0	C	62
	12					7	2	330	
	16					7	3	320	

METEOROLOGICAL PARAMETERS

	PST	T °F	T °F	REL HUM %	%	WIND SPEED KNOTS		MOST FREQ W/D DEG	N
		50%	90%	50%	90%	50%	10%		
TRAVIS AFB									
JAN	08	44	52	88	99	2	0	C	62
	12	51	58	79	93	5	0	C	
	16	53	59	76	95	6	2	330	
APR	08	58	62	74	83	6	0	230	60
	12	67	74	55	78	5	0	240	
	16	68	76	53	76	9	5	310	
JULY	08	67	78	64	72	12	4	240	62
	12	83	96	38	53	10	3	230	
	16	87	101	33	48	10	6	310	
OCT	08	60	68	80	75	3	0	C	62
	12	72	87	49	73	6	2	240	
	16	73	91	45	63	6	3	310	

METEOROLOGICAL PARAMETERS

	PST	T °F 50%	T °F 90%	REL HUM % 50%	REL HUM % 90%	WIND SPEED KNOTS 50%	WIND SPEED KNOTS 10%	MOST FREQ W/D DEG	N
HAYWARD									
JAN	08					4	0	C	62
	12					6	0	C	
	16					7	3	290	
APR	08					4	0	C	60
	12					9	5	280	
	16					14	9	270	
JULY	08					5	0	C	62
	12					9	6	270	
	16					11	8	290	
OCT	08	56	68	81	96	3	0	C	61
	12	66	80	62	84	6	0	270	
	16	67	80	57	72	9	6	290	
SAN FRANCISCO AP									
JAN	08	46	54	87	100	5	0	C	62
	12	52	58	76	93	5	2	050	
	16	53	59	70	92	6	3	300	
APR	08	55	59	75	84	6	2	300	62
	12	61	68	61	80	11	5	290	
	16	60	65	63	72	15	9	290	
JULY	08	61	67	75	84	7	3	310	62
	12	69	76	59	68	12	7	310	
	16	67	75	62	71	17	12	310	
OCT	08	58	64	79	89	4	0	C	62
	12	66	74	60	69	8	4	040	
	16	64	72	65	75	13	6	300	

METEOROLOGICAL PARAMETERS

	PST	T °F	T °F	REL HUM %	REL HUM %	WIND SPEED KNOTS	WIND SPEED KNOTS	MOST FREQ W/D DEG	N
		50%	90%	50%	90%	50%	10%		
SAN JOSE									
JAN	08	48	60	84	95	4	0	C	62
	12	57	65	72	85	5	0	C	
	16	60	66	64	83	7	3	330	
APR	08	58	63	72	82	4	0	C	60
	12	68	77	52	72	9	5	320	
	16	69	78	52	68	12	7	340	
JULY	08	69	75	63	74	4	0	C	62
	12	81	90	43	51	8	4	350	
	16	83	93	42	51	12	8	340	
OCT	08	62	71	72	82	2	0	C	60
	12	75	83	46	59	5	0	C	
	16	76	84	45	58	10	6	350	
SANTA ROSA									
JAN	08	42	55	95	100	0	0	C	62
	12	51	58	83	95	0	0	C	
	16	56	61	74	93	5	0	C	
APR	08	52	57	81	94	0	0	C	59
	12	63	71	57	74	7	0	160	
	16	70	79	49	68	9	7	160	
JULY	08	60	68	77	90	0	0	C	62
	12	76	86	52	60	6	2	180	
	16	85	95	40	53	11	8	160	
OCT	08	53	62	88	96	0	0	C	61
	12	67	78	63	75	4	0	C	
	16	72	84	56	76	9	5	180	

METEOROLOGICAL PARAMETERS

	PST	T °F 50%	T °F 90%	REL HUM % 50%	REL HUM % 90%	WIND SPEED KNOTS 50%	WIND SPEED KNOTS 10%	MOST FREQ W/D DEG	N
					MONTEREY				
JAN	08	47	56	88	99	6	4	110	61
	12	56	63	71	93	5	3	310	
	16	56	63	74	97	6	4	290	
APR	08	53	59	81	97	4	0	C	60
	12	60	65	67	84	8	5	300	
	16	60	64	68	84	9	5	310	
JULY	08	58	62	95	100	2	0	C	62
	12	64	69	77	83	7	4	310	
	16	66	71	72	83	8	5	280	
OCT	08	57	64	84	98	3	0	C	58
	12	65	71	66	83	6	3	310	
	16	65	74	69	81	7	2	290	
					SALINAS				
JAN	08	45	55	82	91	7	0	130	62
	12	55	61	66	82	9	3	130	
	16	57	64	65	79	8	2	310	
APR	08	52	58	67	81	5	0	C	60
	12	64	73	52	70	9	4	300	
	16	62	67	54	64	12	8	280	
JULY	08	60	65	77	85	3	0	C	62
	12	70	77	58	66	10	8	310	
	16	68	72	62	69	12	9	300	
OCT	08	56	64	73	87	5	0	150	62
	12	71	78	47	62	8	0	300	
	16	66	74	59	75	11	8	310	

METEOROLOGICAL PARAMETERS

	PST	T °F 50%	T °F 90%	REL HUM % 50%	REL HUM % 90%	WIND SPEED KNOTS 50%	WIND SPEED KNOTS 10%	MOST FREQ W/D DEG	N
MODESTO									
JAN	08	43	54	93	100	3	0	C	61
	12	49	57	80	98	3	0	C	
	16	52	60	73	92	4	0	C	
APR	08	56	62	69	83	5	0	C	60
	12	68	75	47	68	6	0	320	
	16	71	81	38	52	7	3	310	
JULY	08	73	83	56	70	5	2	320	62
	12	89	97	35	50	6	2	320	
	16	95	104	27	39	8	5	320	
OCT	08	60	69	81	92	2	0	C	62
	12	74	88	46	62	4	0	C	
	16	78	95	39	56	5	0	320	
STOCKTON									
JAN	08	44	55	91	100	5	0	150	62
	12	50	59	81	100	6	2	160	
	16	54	60	74	94	6	2	330	
APR	08	58	64	68	81	6	3	330	60
	12	71	78	44	62	8	4	320	
	16	73	82	41	64	9	5	310	
JULY	08	73	82	55	64	6	2	340	62
	12	89	100	33	42	7	4	310	
	16	96	106	26	40	10	6	310	
OCT	08	58	67	77	92	4	0	C	62
	12	73	89	43	64	6	3	320	
	16	77	95	35	53	6	3	310	

METEOROLOGICAL PARAMETERS

	PST	T °F	T °F	REL HUM %	%	WIND SPEED KNOTS		MOST FREQ W/D DEG	N
		50%	90%	50%	90%	50%	10%		
					FRESNO				
JAN	08	44	55	93	100	4	0	C	62
	12	52	60	78	97	5	2	120	
	16	55	61	70	88	5	2	310	
APR	08	58	66	63	73	6	2	320	60
	12	72	79	40	49	6	3	240	
	16	74	85	32	48	6	3	320	
JULY	08	78	87	43	55	5	3	290	62
	12	93	101	27	35	5	3	250	
	16	99	108	20	28	7	4	280	
OCT	08	60	73	61	79	4	0	C	62
	12	77	92	36	51	5	2	290	
	16	81	97	28	45	5	3	300	
					LEMOORE NAS				
JAN	08	43	52	87	95	3	0	C	62
	12	51	60	74	95	3	0	C	
	16	53	61	69	84	4	0	C	
APR	08	59	64	56	67	5	0	C	60
	12	71	79	37	50	6	0	320	
	16	74	83	31	46	7	3	310	
JULY	08	78	86	41	51	5	2	320	62
	12	92	101	27	37	6	2	320	
	16	97	106	22	31	8	5	320	
OCT	08	60	72	58	73	2	0	C	
	12	78	92	34	48	4	0	C	
	16	80	95	27	44	5	0	320	

METEOROLOGICAL PARAMETERS

	PST	T °F 50%	T °F 90%	REL HUM % 50%	REL HUM % 90%	WIND SPEED KNOTS 50%	WIND SPEED KNOTS 10%	MOST FREQ W/D DEG	N
BAKERSFIELD									
JAN	08	48	58	87	99	3	00	C	62
	12	56	66	71	94	5	0	300	
	16	59	67	68	88	5	2	320	
APR	08	59	66	62	76	4	0	C	60
	12	70	79	42	61	5	3	340	
	16	75	85	34	48	7	4	330	
JULY	08	81	90	45	58	4	0	C	62
	12	92	103	30	45	6	3	270	
	16	99	108	25	35	8	5	310	
OCT	08	66	78	56	72	3	0	C	62
	12	78	95	38	51	4	0	270	
	16	83	98	31	45	6	3	330	
CASTLE AFB									
JAN	08	43	54	88	100	2	0	C	62
	12	50	58	79	95	3	0	C	
	16	52	60	71	92	3	0	C	
APR	08	56	63	67	82	5	1	350	60
	12	68	76	45	60	5	1	320	
	16	70	79	38	56	6	2	340	
JULY	08	75	83	46	62	6	0	360	62
	12	88	98	31	40	6	3	300	
	16	95	103	26	34	7	3	340	
OCT	08	59	70	75	94	2	0	C	62
	12	75	86	44	59	4	1	320	
	16	78	93	37	60	6	0	320	

METEOROLOGICAL PARAMETERS

	PST	T °F	T °F	REL HUM %	REL HUM %	WIND SPEED KNOTS	WIND SPEED KNOTS	MOST FREQ W/D DEG	N
		50%	90%	50%	90%	50%	10%		
OXNARD									
JAN	08					6	3	030	
	12					7	3	070	
	16					7	4	270	
APR	08					5	3	020	
	12					9	6	270	
	16					10	7	270	
JULY	08					4	0	C	
	12					8	6	240	
	16					9	6	270	
OCT	08					4	0	C	
	12					8	3	250	
	16					8	4	270	
PASO ROBLES									
JAN	08	42	54	90	97	0	0	C	62
	12	53	60	70	89	5	0	C	
	16	57	65	65	83	6	0	C	
APR	08	49	55	81	97	3	0	C	60
	12	66	75	50	72	6	0	C	
	16	67	80	46	72	9	0	C	
JULY	08	65	75	64	82	2	0	C	62
	12	89	99	29	50	6	0	C	
	16	91	103	29	47	13	6	220	
OCT	08	53	64	82	98	0	0	C	61
	12	74	88	40	60	5	0	C	
	16	77	96	32	50	9	4	220	

METEOROLOGICAL PARAMETERS

	PST	T ^{O}F	T ^{O}F	REL %	HUM %	WIND SPEED KNOTS		MOST FREQ W/D DEG	N
		50%	90%	50%	90%	50%	10%		
PT MUGU									
JAN	08	51	59	79	92	3	0	C	62
	12	61	68	67	85	6	2	180	
	16	58	64	73	89	6	1	300	
APR	08	58	63	78	91	2	0	C	60
	12	63	69	66	78	7	3	260	
	16	62	69	68	81	7	3	270	
JULY	08	64	70	80	93	3	0	C	62
	12	69	74	66	75	7	5	270	
	16	69	72	66	75	7	5	280	
OCT	08	61	67	82	96	1	0	C	62
	12	70	75	62	77	5	2		
	16	67	72	67	81	5	2		
SANTA BARBARA									
JAN	08	49	57	75	86	0	0	C	61
	12	60	68	64	78	7	0	130	
	16	59	67	61	80	6	2	250	
APR	08	59	64	73	88	5	0	C	60
	12	65	72	59	76	7	5	170	
	16	64	72	63	75	8	5	250	
JULY	08	65	71	79	97	5	0	C	62
	12	70	75	65	78	7	4	210	
	16	70	76	67	75	8	5	230	
OCT	08	62	66	82	100	3	0	C	62
	12	70	77	68	82	7	4	230	
	16	69	77	67	86	7	3	240	

METEOROLOGICAL PARAMETERS

VANDENBERG AFB

	PST	T ^{O}F 50%	T ^{O}F 90%	REL HUM % 50%	REL HUM % 90%	WIND SPEED KNOTS 50%	WIND SPEED KNOTS 10%	MOST FREQ W/D DEG	N
JAN	08	50	56	90	100	2	0	C	44
	12	58	69	72	94	6	0	310	
	16	57	62	76	98	6	3	320	
APR	08	55	60	75	87	5	0	C	43
	12	61	68	58	73	12	5	310	
	16	58	64	68	77	10	5	320	
JULY	08	57	62	90	100	1	0	C	43
	12	65	69	73	84	9	4	310	
	16	63	67	76	90	9	5	320	
OCT	08	58	64	78	92	2	0	C	44
	12	67	75	62	78	6	3	310	
	16	63	69	69	84	7	2	310	

METEOROLOGICAL PARAMETERS

	PST	T ^{O}F	T ^{O}F	REL HUM %	HUM %	WIND SPEED KNOTS	KNOTS	MOST FREQ W/D DEG	N
		50%	90%	50%	90%	50%	10%		
					BURBANK				
JAN	08	51	59	67	99	3	0	C	62
	12	61	70	46	95	5	0	120	
	16	63	71	49	93	7	3	180	
APR	08	61	69	46	72	0	0	C	60
	12	72	85	31	52	5	3	180	
	16	72	85	32	51	8	5	180	
JULY	08	74	82	57	74	3	0	C	62
	12	88	96	38	50	7	3	150	
	16	89	97	35	47	9	6	170	
OCT	08	64	69	65	88	0	0	C	60
	12	78	87	37	59	5	0	140	
	16	77	87	41	69	6	4	170	
					EL MONTE				
JAN	08					2	0	C	31
	12					6	0	C	
	16					0	0	C	
APR	08					0	0	C	31
	12					6	4	200	
	16					9	7	240	
JULY	08					3	0	C	31
	12					6	4	230	
	16					9	7	200	
OCT	08								0
	12								
	16								

METEOROLOGICAL PARAMETERS

	PST	T °F	T °F	REL HUM %	REL HUM %	WIND SPEED KNOTS	WIND SPEED KNOTS	MOST FREQ W/D DEG	N
		50%	90%	50%	90%	50%	10%		
					LOS ANGELES (LAX)				
JAN	08	53	60	80	97	5	2	080	62
	12	62	70	62	84	6	3	120	
	16	62	67	67	86	8	5	260	
APR	08	60	66	76	90	4	2	250	60
	12	65	71	67	80	10	7	250	
	16	64	68	66	79	11	7	260	
JULY	08	69	75	73	89	5	2	250	62
	12	73	78	64	74	9	7	250	
	16	72	76	66	75	11	8	260	
OCT	08	65	70	75	91	3	0	C	62
	12	71	78	62	74	8	6	250	
	16	68	74	69	80	10	6	260	
					MARCH AFB				
JAN	08	48	55	85	100	1	0	C	62
	12	57	68	61	96	3	0	C	
	16	57	67	57	94	3	0	C	
APR	08	57	68	71	86	0	0	C	60
	12	70	83	39	63	2	0	C	
	16	72	83	42	63	5	2	330	
JULY	08	77	85	49	68	0	0	C	61
	12	93	100	26	43	4	2	320	
	16	93	100	28	42	6	4	320	
OCT	08	62	72	70	92	0	0	C	62
	12	78	95	28	54	3	0	C	
	16	77	89	37	57	4	1	300	

METEOROLOGICAL PARAMETERS

	PST	T °F	T °F	REL HUM %	REL HUM %	WIND SPEED KNOTS	WIND SPEED KNOTS	MOST FREQ W/D DEG	N
		50%	90%	50%	90%	50%	10%		
				NORTON AFB					
JAN	08	46	55	75	87	2	0	C	62
	12	58	67	51	83	3	0	C	
	16	58	69	47	83	4	0	C	
APR	08	59	69	60	79	1	0	C	60
	12	72	83	40	66	4	1	210	
	16	74	84	41	62	7	2	240	
JULY	08	76	84	53	73	0	0	C	62
	12	95	102	29	44	4	1	250	
	16	95	102	28	42	8	5	250	
OCT	08	63	71	54	76	0	0	C	62
	12	80	94	29	53	3	0	260	
	16	80	91	33	55	6	2	240	
				ONTARIO					
JAN	08	49	56	92	100	5	3	070	62
	12	59	70	72	97	6	3	220	
	16	61	73	60	92	7	3	270	
APR	08	58	67	75	92	5	1	230	60
	12	71	84	48	72	8	4	270	
	16	72	84	38	64	12	8	240	
JULY	08	73	81	70	91	4	0	180	60
	12	91	99	35	54	8	5	270	
	16	92	99	36	51	12	9	260	
OCT	08	63	71	78	96	3	0	C	62
	12	79	92	42	72	6	1	250	
	16	80	91	41	60	10	5	230	

METEOROLOGICAL PARAMETERS

	PST	T °F 50%	T °F 90%	REL HUM % 50%	REL HUM % 90%	WIND SPEED KNOTS 50%	WIND SPEED KNOTS 10%	MOST FREQ W/D DEG	N
				SAN NICOLAS IS					
JAN	08	53	59	85	98	4	0	C	62
	12	58	65	72	94	6	1	300	
	16	57	63	73	95	5	0	320	
APR	08	58	64	80	91	10	2	320	60
	12	63	70	66	75	9	3	320	
	16	61	68	68	78	12	4	310	
JULY	08	61	67	89	100	9	2	320	62
	12	67	75	71	80	10	5	320	
	16	68	75	67	78	12	5	310	
OCT	08	63	72	85	98	5	0	310	62
	12	69	76	65	76	8	2	340	
	16	66	76	71	81	9	2	310	
				SANTA ANA (Orange Co)					
JAN	08	54	62	100	100	4	0	C	62
	12	66	72			7	3	180	
	16	63	69			8	6	240	
APR	08	63	69			4	0	C	60
	12	70	79			9	6	180	
	16	69	76			9	8	230	
JULY	08	69	75			5	2	230	62
	12	76	84			10	7	180	
	16	75	82			11	8	200	
OCT	08	65	70	78	99	4	0	C	
	12	74	83	55	75	9	5		

METEOROLOGICAL PARAMETERS

	PST	T °F	T °F	REL HUM %	REL HUM %	WIND SPEED KNOTS	WIND SPEED KNOTS	MOST FREQ W/D DEG	N
		50%	90%	50%	90%	50%	10%		
					BEAUMONT				
JAN	08	46	52	100	100	6	0	C	61
	12	51	62	62	100	8	0	090	
	16	52	59	59	100	7	0	090	
APR	08	57	67	52	100	5	0	C	60
	12	69	80	35	82	8	5	250	
	16	71	83	31	72	7	5	250	
JULY	08	80	88	38	65	5	0	C	57
	12	95	101	21	34	7	4	260	
	16	95	102	20	34	7	4	260	
OCT	08	61	78	49	100	4	0	C	57
	12	77	96	20	55	9	5	260	
	16	75	92	25	55	7	4	260	
					BLYTHE				
JAN	08	48	58	68	92	3	0	C	62
	12	60	69	44	80	3	0	C	
	16	62	71	41	71	6	0	C	
APR	08	70	79	28	44	3	0	C	60
	12	82	93	18	30	6	0	C	
	16	86	96	14	23	7	2	C	
JULY	08	94	99	34	56	5	0	C	62
	12	105	111	20	35	7	0	140	
	16	109	115	18	31	9	3	140	
OCT	08	72	85	38	59	0	0	C	62
	12	87	100	25	38	4	0	C	
	16	90	103	20	34	6	0	C	

METEOROLOGICAL PARAMETERS

	PST	T °F 50%	T °F 90%	REL HUM % 50%	REL HUM % 90%	WIND SPEED KNOTS 50%	WIND SPEED KNOTS 10%	MOST FREQ W/D DEG	N
DAGGETT									
JAN	08	44	55	69	97	5	0	C	62
	12	56	65	44	82	6	0	C	
	16	57	67	38	75	8	4	240	
APR	08	61	68	43	59	10	5	270	60
	12	75	85	24	36	8	3	290	
	16	79	88	16	34	9	3	250	
JULY	08	85	93	29	46	9	2	270	62
	12	101	107	17	29	7	4	300	
	16	105	111	13	28	10	4	260	
OCT	08	65	78	33	48	9	4	260	62
	12	82	98	17	28	7	0	C	
	16	85	101	14	25	7	4	050	
EDWARDS AFB									
JAN	08	38	51	86	100	2	0	C	60
	12	51	62	53	88	6	0	C	
	16	55	63	55	86	7	0	C	
APR	08	55	64	56	74	6	0	C	60
	12	70	79	28	48	6	0	C	
	16	72	83	26	52	11	0	250	
JULY	08	81	89	29	46	5	0	C	62
	12	97	103	15	24	6	0	230	
	16	100	107	14	22	12	7	230	
OCT	08	61	70	32	47	1	0	C	62
	12	77	92	19	30	4	0	C	
	16	80	97	16	33	6	0	C	

METEOROLOGICAL PARAMETERS

	PST	T °F 50%	T °F 90%	REL HUM % 50%	REL HUM % 90%	WIND SPEED KNOTS 50%	WIND SPEED KNOTS 10%	MOST FREQ W/D DEG	N
GEORGE AFB									
JAN	08	39	51	77	95	3	0	C	62
	12	52	62	51	83	7	0	030	
	16	52	60	53	80	8	0	290	
APR	08	56	64	47	72	4	0	260	60
	12	69	79	28	52	4	1	290	
	16	72	80	23	48	8	1	280	
JULY	08	81	90	30	48	3	0	C	60
	12	95	102	17	29	5	0	210	
	16	98	104	16	26	10	4	200	
OCT	08	60	75	39	68	2	0	150	62
	12	76	92	20	39	4	0	C	
	16	76	94	18	35	5	0	200	
IMPERIAL									
JAN	08	47	58	80	100	4	0	C	62
	12	62	70	46	84	6	0	C	
	16	64	72	41	79	6	0	C	
APR	08	67	76	43	63	5	0	C	60
	12	80	90	23	40	5	0	C	
	16	83	93	20	34	6	2	270	
JULY	08	90	95	45	66	6	0	C	62
	12	102	109	23	43	6	0	C	
	16	106	112	20	36	7	4	150	
OCT	08	73	83	39	67	5	0	C	62
	12	88	99	24	38	5	0	C	
	16	90	103	19	34	5	0	C	

METEOROLOGICAL PARAMETERS

	PST	T °F 50%	T °F 90%	REL HUM % 50%	REL HUM % 90%	WIND SPEED KNOTS 50%	WIND SPEED KNOTS 10%	MOST FREQ W/D DEG	N
					INYOKERN				
JAN	08	38	51	73	96	1	0	C	62
	12	53	60	44	88	2	0	C	
	16	57	65	37	68	3	0	C	
APR	08	59	66	38	57	1	0	C	60
	12	74	83	19	34	4	1	270	
	16	77	85	16	29	8	2	290	
JULY	08	82	91	26	38	1	0	C	60
	12	99	106	15	22	4	1	180	
	16	104	110	10	18	9	3	200	
OCT	08	61	73	31	50	0	0	C	62
	12	79	95	16	28	3	0	C	
	16	82	100	13	23	5	0	C	
					LANCASTER				
JAN	08	37	52	84	95	4	0	C	62
	12	52	60	54	01	8	0	C	
	16	54	62	50	88	10	0	230	
APR	08	55	64	50	68	10	0	C	60
	12	69	79	27	49	12	0	C	
	16	70	80	27	52	16	5	230	
JULY	08	81	90	29	44	6	0	C	62
	12	95	103	16	30	12	4	240	
	16	96	103	18	28	19	14	240	
OCT	08	60	69	45	63	0	0	C	62
	12	75	93	21	42	9	2	070	
	16	76	94	20	46	15	2	230	

METEOROLOGICAL PARAMETERS

	PST	T ^{0}F 50%	T ^{0}F 90%	REL HUM % 50%	REL HUM % 90%	WIND SPEED KNOTS 50%	WIND SPEED KNOTS 10%	MOST FREQ W/D DEG	N
NEEDLES									
JAN	08	53	62	59	87	5	0	C	29
	12	57	66	45	77	6	0	C	
	16	59	67	37	78	7	0	C	
APR	08	67	78	32	52	5	0	C	59
	12	80	91	18	31	7	0	C	
	16	84	94	15	26	9	5	180	
JULY	08	94	100	25	49	9	0	C	61
	12	106	111	16	32	7	0	180	
	16	108	115	11	21	9	4	190	
OCT	08	71	83	26	43	0	0	C	59
	12	85	99	18	27	6	0	C	
	16	88	99	16	27	8	0	C	
PALM SPRINGS									
JAN	08	50	58			5	0	290	62
	12	65	80			6	0	C	
	16	63	71			5	0	C	
APR	08	73	82			6	3	300	30
	12	84	91			8	5	310	
	16	86	92			13	5	300	
JULY	08	94	102			5	0	C	62
	12	107	113			7	4	090	
	16	100	115			12	6	280	
OCT	08	75	91			5	0	C	62
	12	91	106			7	4	100	
	16	88	104			8	4	290	

METEOROLOGICAL PARAMETERS

	PST	T ^{O}F 50%	T ^{O}F 90%	REL HUM % 50%	REL HUM % 90%	WIND SPEED KNOTS 50%	WIND SPEED KNOTS 10%	MOST FREQ W/D DEG	N
					THERMAL				
JAN	08	47	58	77	95	2	0	C	62
	12	65	73	48	81	5	0	C	
	16	64	.74	46	79	5	0	C	
APR	08	71	79	38	52	6	2	340	60
	12	84	94	20	37	7	2	130	
	16	86	95	18	32	8	3	130	
JULY	08	90	98	38	62	5	0	C	62
	12	102	110	21	42	6	0	120	
	16	107	112	18	39	6	4	120	
OCT	08	73	84	44	62	4	0	C	62
	12	88	100	26	42	5	1	170	
	16	89	101	25	42	5	2	120	

METEOROLOGICAL PARAMETERS

	PST	T °F	T °F	REL HUM %	REL HUM %	WIND SPEED KNOTS	WIND SPEED KNOTS	MOST FREQ W/D DEG	N
		50%	90%	50%	90%	50%	10%		
					CARLSBAD				
JAN	08					6	0	060	
	12					8	4	240	
	16					7	4	270	
APR	08					4	0	C	
	12					9	5	270	
	16					9	6	240	
JULY	08					5	0	C	
	12					9	6	240	
	16					8	6	240	
OCT	08					4	0	C	
	12					9	5	270	
	16					8	5	240	

METEOROLOGICAL PARAMETERS

	PST	T °F 50%	T °F 90%	REL HUM % 50%	REL HUM % 90%	WIND SPEED KNOTS 50%	WIND SPEED KNOTS 10%	MOST FREQ W/D DEG	N
GILLESPIE FIELD									
JAN	08	53	60			0	0	C	62
	12	63	69			5	0	C	
	16	63	72			7	4	270	
APR	08	57	62			0	0	C	60
	12	69	82			7	4	270	
	16	66	81			9	6	270	
JULY	08	71	82			0	0	C	62
	12	84	94			7	4	270	
	16	83	90			8	5	270	
OCT	08	60	66			0	0	C	62
	12	74	85			6	0	270	
	16	73	82			7	5	270	
SAN DIEGO AP									
JAN	08	57	63	74	91	5	0	C	62
	12	64	69	62	85	8	4	180	
	16	63	68	67	84	8	4	310	
APR	08	62	67	70	82	5	2	310	60
	12	68	75	58	70	10	7	310	
	16	68	75	62	71	10	7	310	
JULY	08	71	76	76	86	6	3	270	62
	12	76	80	66	73	9	6	290	
	16	75	80	66	74	9	5	310	
OCT	08	66	71	75	91	4	0	C	62
	12	72	79	64	79	9	5	300	
	16	71	78	69	78	9	5	310	

SACRAMENTO VALLEY AIR BASIN

MIXING HEIGHTS
(m-agl)

	N	AM 50%	AM 10%	PM 50%	PM 10%
RED BLUFF					
JAN	0	-	-	-	-
FEB	0	-	-	-	-
MAR	13	130	95	1425	650
APR	38	140	95	>Inv	625
MAY	38	215	110	>Inv	1055
JUN	38	245	85	>Inv	1500
JUL	46	200	90	>Inv	1010
AUG	47	175	90	>Inv	1325
SEP	44	120	85	>Inv	1225
OCT	49	105	75	1135	240
NOV	40	110	70	920	335
DEC	32	95	65	520	230
SACRAMENTO					
JAN	5	160	-	285	-
FEB	7	140	-	400	-
MAR	13	140	100	725	215
APR	25	190	95	1170	620
MAY	22	240	110	1205	605
JUN	19	200	65	1485	725
JUL	38	175	85	980	455
AUG	53	190	140	900	495
SEP	49	155	100	1045	555
OCT	49	200	95	980	530
NOV	39	100	70	510	370
DEC	18	105	80	390	120

NORTH COAST AIR BASIN

MIXING HEIGHTS
(m-agl)

	N	AM 50%	AM 10%	PM 50%	PM 10%
			UKIAH		
JAN	0	-	-	-	-
FEB	11	335	85	1055	90
MAR	21	240	100	1320	500
APR	35	285	120	>Inv	415
MAY	50	245	120	>Inv	890
JUN	60	315	120	>Inv	1158
JUL	58	175	110	>Inv	905
AUG	61	150	90	>Inv	1005
SEP	49	120	85	1290	735
OCT	26	210	130	1000	490
NOV	25	180	75	635	85
DEC	17	170	80	575	285

LAKE COUNTY AIR BASIN

MIXING HEIGHTS
(m-agl)

1980	AM			PM		
	N	50%	10%	N	50%	10%
			LAKEPORT			
JAN	-	-	-	-	-	-
FEB	-	-	-	-	-	-
MAR	-	-	-	-	-	-
APR	-	-	-	-	-	-
MAY	-	-	-	-	-	-
JUN	-	-	-	-	-	-
JUL	26	60	40	29	>1300	920
AUG	30	60	25	31	1090	825
SEP	25	50	25	28	985	370
OCT	16	50	30	19	485	330
NOV	11	65	30	13	495	200
DEC	-	-	-	-	-	-

SAN FRANCISCO BAY AIR BASIN

MIXING HEIGHTS
(m-agl)

	N	AM 50%	AM 10%	PM 50%	PM 10%
			OAKLAND		
JAN	59	>Inv	185	>Inv	190
FEB	56	>Inv	160	>Inv	325
MAR	42	>Inv	270	>Inv	530
APR	31	860	260	2280	510
MAY	61	680	210	810	360
JUN	58	530	190	725	415
JUL	31	495	220	580	405
AUG	43	625	420	680	510
SEP	58	510	125	695	555
OCT	56	655	120	1005	405
NOV	28	430	130	1070	350
DEC	58	255	80	375	180

LAKE TAHOE AIR BASIN

MIXING HEIGHTS
(m-agl)

		AM		PM	
	N	50%	10%	50%	10%
			TAHOE CITY		
JAN	14	90	55	510	130
FEB	10	70	50	795	480
MAR	-	-	-	-	-
APR	-	-	-	-	-
MAY	-	-	-	-	-
JUN	-	-	-	-	-
JUL	-	-	-	-	-
AUG	-	-	-	-	-
SEP	-	-	-	-	-
OCT	-	-	-	-	-
NOV	-	-	-	-	-
DEC	-	-	-	-	-

NORTH CENTRAL COAST AIR BASIN

MIXING HEIGHTS
(m-agl)

	N	AM 50%	AM 10%	PM 50%	PM 10%
			SALINAS		
JAN	35	340	160	975	345
FEB	24	205	105	840	365
MAR	31	240	130	1495	740
APR	52	550	145	1330	830
MAY	60	660	130	1380	500
JUN	53	520	225	805	455
JUL	48	470	270	515	425
AUG	52	530	305	670	435
SEP	26	360	125	725	400
OCT	31	450	120	1140	540
NOV	47	160	75	975	370
DEC	31	130	80	730	285

SAN JOAQUIN VALLEY AIR BASIN

MIXING HEIGHTS
(m-agl)

		AM		PM	
	N	50%	10%	50%	10%
			FRESNO		
JAN	56	180	85	450	130
FEB	27	190	95	1050	215
MAR	28	240	115	1455	585
APR	55	225	105	>Inv	1110
MAY	60	220	80	>Inv	1233
JUN	58	175	85	>Inv	1420
JUL	48	190	100	>Inv	1220
AUG	33	165	90	>Inv	1200
SEP	59	115	75	>Inv	1030
OCT	30	130	85	1215	830
NOV	27	100	75	690	365
DEC	28	75	55	390	120

SOUTH CENTRAL COAST AIR BASIN

MIXING HEIGHTS
(m-agl)

	N	AM 50%	AM 10%	PM 50%	PM 10%
			VANDENBERG AFB		
JAN	22	455	55	>Inv	175
FEB	29	905	140	>Inv	370
MAR	43	>Inv	200	>Inv	265
APR	39	1010	280	850	280
MAY	24	660	120	620	135
JUN	36	435	195	450	220
JUL	43	385	175	405	235
AUG	34	365	130	385	170
SEP	21	290	90	325	145
OCT	43	305	100	530	190
NOV	39	210	85	480	180
DEC	25	230	30	760	210
			PT MUGU		
JAN	42	120	20	>Inv	300
FEB	35	100	30	>Inv	235
MAR	29	725	55	>Inv	365
APR	12	65	20	515	280
MAY	43	475	45	820	325
JUN	41	120	30	465	285
JUL	43	190	45	360	270
AUG	34	135	45	530	325
SEP	8	135	-	365	-
OCT	31	90	30	580	210
NOV	37	55	20	>Inv	275
DEC	34	65	20	910	200

SOUTH COAST AIR BASIN

MIXING HEIGHTS
(m-agl)

EL MONTE

		AM		PM	
	N	50%	10%	50%	10%
JAN	19	240	70	>Inv	570
FEB	10	245	105	830	470
MAR					
APR	20	365	75	>Inv	1300
MAY	21	555	70	1485	915
JUN	21	285	110	1120	845
JUL	21	290	140	965	715
AUG	6	280	-	1220	-
SEP	15	225	140	>Inv	800
OCT	-	-	-	-	-
NOV	-	-	-	-	-
DEC	-	-	-	-	-

LOS ANGELES (LAX)

		AM		PM	
	N	50%	10%	50%	10%
JAN	28	>Inv	130	>Inv	1405
FEB	26	580	140	1800	290
MAR	31	945	125	>Inv	555
APR	12	675	160	1225	390
MAY	25	790	75	1060	585
JUN	30	550	110	775	395
JUL	31	485	240	585	310
AUG	8	545	-	630	-
SEP	-	335	125	510	395
OCT	-	-	-	-	-
NOV	-	-	-	-	-
DEC	-	-	-	-	-

SOUTH COAST AIR BASIN

MIXING HEIGHTS
(m-agl)

		AM		PM	
	N	50%	10%	50%	10%
			RIALTO		
JAN	-	-	-	-	-
FEB	-	-	-	-	-
MAR	-	-	-	-	-
APR	-	-	-	-	-
MAY	-	-	-	-	-
JUN	-	-	-	-	-
JUL	-	-	-	-	-
AUG	10	-	-	1170	525
SEP	30	-	-	785	560
OCT	-	-	-	-	-
NOV	-	-	-	-	-
DEC	-	-	-	-	-
			SAN BERNARDINO		
JAN	29	70	45	1260	290
FEB	36	65	45	>Inv	520
MAR	41	170	60	>Inv	430
APR	41	90	45	>Inv	>Inv
MAY	22	510	190	>Inv	830
JUN	45	125	60	>Inv	>Inv
JUL	57	170	75	>Inv	>Inv
AUG	5	-	-	-	-
SEP	20	80	20	>Inv	>INV
OCT	11	105	55	>Inv	>Inv
NOV	0	-	-	-	-
DEC	9	75	50	>Inv	>Inv

SOUTH COAST AIR BASIN

MIXING HEIGHTS
(m-agl)

SAN NICOLAS IS

	N	AM 50%	AM 10%	PM 50%	PM 10%
JAN	14	355	40	410	95
FEB	-	-	-	-	-
MAR	-	-	-	-	-
APR	13	635	40	635	120
MAY	27	590	130	625	260
JUN	24	400	100	450	270
JUL	20	360	100	490	180
AUG	15	560	130	740	295
SEP	14	-	-	-	-
OCT	6	430	-	665	-
NOV	15	285	45	>Inv	355
DEC	14	165	40	665	175

SOUTHEAST DESERT AIR BASIN

MIXING HEIGHTS
(m-agl)

		AM		PM	
	N	50%	10%	50%	10%
			CHINA LAKE		
JAN	12	995	130	>Inv	460
FEB	12	195	80	>Inv	820
MAR	-	-	-	-	-
APR	17	1510	65	>Inv	2090
MAY	19	>Inv	90	>Inv	>Inv
JUN	10	>Inv	85	>Inv	>Inv
JUL	9	205	75	>Inv	>Inv
AUG	6	320	-	>Inv	>Inv
SEP	6	160	-	>Inv	-
OCT	10	145	55	>Inv	>Inv
NOV	8	110	-	>Inv	-
DEC	-	-	-	-	-
			EDWARDS AFB		
JAN	25	>Inv	10	>Inv	640
FEB	38	945	45	>Inv	455
MAR	43	>Inv	50	>Inv	940
APR	34	315	60	>Inv	>Inv
MAY	20	125	40	>Inv	>Inv
JUN	37	95	35	>Inv	>Inv
JUL	36	210	55	>Inv	>Inv
AUG	19	230	30	>Inv	>Inv
SEP	23	155	45	>Inv	>Inv
OCT	43	95	30	>Inv	>Inv
NOV	26	70	15	>Inv	>Inv
DEC	31	75	25	>Inv	330

SOUTHEAST DESERT AIR BASIN

MIXING HEIGHTS
(m-agl)

		AM		PM	
	N	50%	10%	50%	10%
			THERMAL		
JAN	56	80	55	890	250
FEB	51	100	60	1145	520
MAR	58	120	70	1315	325
APR	33	100	60	1040	470
MAY	31	90	60	960	380
JUN	42	100	55	>Inv	465
JUL	19	145	95	>Inv	>Inv
AUG	31	180	95	>Inv	>Inv
SEP	56	95	60	>Inv	>Inv
OCT	56	90	60	>Inv	>Inv
NOV	57	65	50	>Inv	755
DEC	58	65	45	>Inv	450

SAN DIEGO AIR BASIN

MIXING HEIGHTS
(m-agl)

		AM		PM	
	N	50%	10%	50%	10%
			SAN DIEGO		
JAN	59	>Inv	110	>Inv	720
FEB	24	455	155	>Inv	375
MAR	40	>Inv	720	>Inv	1000
APR	51	830	275	1265	485
MAY	62	1175	370	1200	525
JUN	19	960	145	1210	535
JUL	57	475	280	520	360
AUG	61	680	350	715	405
SEP	58	535	215	610	330
OCT	17	370	55	>Inv	295
NOV	57	350	60	>Inv	385
DEC	59	165	40	>Inv	310

SACRAMENTO VALLEY AIR BASIN

VENTILATION FACTORS
(m^2/sec x 10^3)

	AM			PM		
	N	50%	10%	N	50%	10%
RED BLUFF						
JAN	--	----	--	--	----	----
FEB	--	----	--	--	----	----
MAR	13	.52	.13	11	4.05	2.38
APR	38	.49	.16	38	5.02	2.13
MAY	38	.76	.27	38	6.90	3.09
JUN	38	.68	.27	38	6.90	2.54
JUL	46	.60	.25	46	8.55	5.40
AUG	47	.41	.16	47	6.90	3.90
SEP	44	.41	.09	44	6.52	2.25
OCT	49	.29	.06	49	2.89	.75
NOV	40	.32	.10	40	1.84	.27
DEC	32	.27	.07	32	1.15	.29
SACRAMENTO						
JAN	--	--	--	--	----	----
FEB	--	--	--	--	----	----
MAR	13	.74	.10	12	3.17	.56
APR	24	.65	.11	24	5.32	2.13
MAY	22	.81	.14	22	5.15	3.20
JUN	19	.51	.07	19	7.74	3.50
JUL	38	.56	.09	38	4.47	2.14
AUG	53	.66	.17	51	3.84	2.53
SEP	49	.51	.10	48	3.72	2.31
OCT	49	.44	.08	49	2.63	.97
NOV	39	.17	.04	39	1.31	.59
DEC	18	.17	.05	18	1.04	.39

NORTH COAST AIR BASIN

VENTILATION FACTORS
($m^2/sec \times 10^3$)

	AM			PM		
	N	50%	10%	N	50%	10%
UKIAH						
JAN	--	--	--	--	----	----
FEB	11	.23	.05	--	----	----
MAR	21	.12	.06	19	7.22	1.25
APR	35	.17	.09	32	6.15	2.24
MAY	50	.15	.06	48	6.90	5.12
JUN	60	.35	.06	57	7.65	5.11
JUL	58	.12	.06	56	6.90	4.69
AUG	61	.09	.05	61	5.40	4.09
SEP	49	.07	.04	45	5.61	2.26
OCT	26	.12	.08	25	3.22	.31
NOV	25	.10	.04	24	.77	.04
DEC	17	.08	.05	17	.46	.24

LAKE TAHOE AIR BASIN

VENTILATION FACTORS
(m^2/sec x 10^3)

	AM			PM		
	N	50%	10%	N	50%	10%
			TAHOE CITY			
JAN	14	.11	.03	15	1.41	.55
FEB	10	.07	.03	11	3.24	1.19
MAR	--	--	--	--	----	----
APR	--	--	--	--	----	----
MAY	--	--	--	--	----	----
JUN	--	--	--	--	----	----
JUL	--	--	--	--	----	----
AUG	--	--	--	--	----	----
SEP	--	--	--	--	----	----
OCT	--	--	--	--	----	----
NOV	--	--	--	--	----	----
DEC	--	--	--	--	----	----

SAN FRANCISCO BAY AIR BASIN

VENTILATION FACTORS
(m^2/sec x 10^3)

	AM N	AM 50%	AM 10%	PM N	PM 50%	PM 10%
			OAKLAND			
JAN	59	4.94	.38	58	3.90	.42
FEB	56	5.17	.33	56	6.22	1.16
MAR	42	5.46	.39	42	6.22	1.85
APR	31	2.67	.37	31	9.75	2.14
MAY	61	2.47	.46	61	4.55	1.91
JUN	58	1.54	.36	59	4.11	2.13
JUL	31	1.04	.48	30	2.98	1.74
AUG	43	1.49	.56	43	3.79	1.68
SEP	58	1.04	.15	58	3.37	2.05
OCT	56	2.10	.21	54	3.98	1.35
NOV	28	1.14	.23	28	6.88	.95
DEC	50	.73	.12	49	.94	.30

NORTH CENTRAL COAST AIR BASIN

VENTILATION FACTORS
($m^2/sec \times 10^3$)

	AM			PM		
	N	50%	10%	N	50%	10%
			SALINAS			
JAN	35	1.10	.22	35	3.23	1.48
FEB	24	.88	.33	24	3.72	1.41
MAR	31	.83	.12	31	9.92	4.09
APR	52	1.56	.23	52	8.98	4.47
MAY	60	1.60	.40	60	6.96	3.28
JUN	53	1.65	.27	53	5.25	2.91
JUL	48	1.01	.24	48	4.14	2.63
AUG	52	1.02	.18	52	4.53	2.73
SEP	26	.50	.13	25	4.46	2.14
OCT	31	1.17	.23	32	5.84	2.87
NOV	47	.59	.13	47	3.82	1.19
DEC	31	.60	.24	31	2.19	.44

SAN JOAQUIN VALLEY AIR BASIN

VENTILATION FACTORS
(m^2/sec x 10^3)

	AM			PM		
	N	50%	10%	N	50%	10%
FRESNO						
JAN	50	.63	.08	50	1.62	.45
FEB	27	.47	.15	27	2.94	.60
MAR	28	.61	.19	28	6.36	2.00
APR	55	.64	.20	55	5.40	3.00
MAY	60	.56	.23	60	6.15	5.98
JUN	58	.66	.24	58	6.90	7.52
JUL	48	.50	.26	48	5.40	4.51
AUG	33	.34	.12	34	5.40	4.52
SEP	59	.25	.06	58	4.65	2.64
OCT	30	.29	.13	30	3.70	1.34
NOV	28	.19	.05	27	1.87	.49
DEC	28	.11	.03	28	.82	.20

SOUTH CENTRAL COAST AIR BASIN

VENTILATION FACTORS
(m^2/sec x 10^3)

	AM			PM		
	N	50%	10%	N	50%	10%
			VANDENBERG AFB			
JAN	22	3.61	.09	21	6.15	.25
FEB	29	4.43	.33	30	5.58	1.05
MAR	43	8.4	.27	42	8.55	.72
APR	39	6.05	.59	36	11.77	1.41
MAY	24	2.67	.11	25	4.05	.56
JUN	36	1.49	.61	36	3.71	1.53
JUL	43	1.11	.12	44	2.05	.81
AUG	33	.66	.09	33	1.85	.94
SEP	21	.72	.08	21	1.92	.43
OCT	43	.81	.05	43	2.56	.57
NOV	39	.52	.09	41	2.62	.59
DEC	25	.78	.05	25	8.76	.64
			PT. MUGU			
JAN	42	.52	.02	41	7.05	.78
FEB	35	.12	.01	33	4.65	.51
MAR	29	2.50	.05	26	6.82	.72
APR	12	.06	.01	12	2.06	.64
MAY	43	.51	.03	43	2.64	1.19
JUN	41	.13	.03	41	1.96	.91
JUL	43	.24	.03	43	1.48	.97
AUG	34	.11	.03	32	1.95	1.07
SEP	8	.12	.02	7	1.62	.72
OCT	31	.11	.03	31	1.85	.35
NOV	37	.10	.02	36	5.55	.69
DEC	34	.13	.01	31	13.5	.28

SOUTHEAST DESERT AIR BASIN

VENTILATION FACTORS
($m^2/sec \times 10^3$)

	AM			PM		
	N	50%	10%	N	50%	10%
			CHINA LAKE			
JAN	12	2.83	.06	12	2.62	.74
FEB	12	.43	.04	12	3.22	1.23
MAR	--	--	--	3	----	----
APR	17	4.23	.03	17	6.30	3.03
MAY	13	4.95	.05	9	6.60	3.60
JUN	10	1.84	.04	10	8.55	4.80
JUL	9	.21	.08	9	6.00	3.45
AUG	6	.37	.09	6	6.15	----
SEP	6	.08	.04	6	4.35	----
OCT	10	.07	.02	10	3.60	1.35
NOV	8	.06	.02	8	3.90	2.40
DEC	--	--	--	2	----	----
			EDWARDS AFB			
JAN	25	4.05	.02	25	10.8	2.62
FEB	39	5.0	.03	38	7.87	2.25
MAR	43	4.8	.04	42	8.10	3.33
APR	34	1.23	.03	34	9.90	2.52
MAY	20	.46	.02	20	10.27	4.50
JUN	37	.25	.02	37	9.75	6.33
JUL	36	.41	.05	36	10.35	7.59
AUG	19	1.55	.03	19	9.75	6.06
SEP	23	.11	.03	23	7.65	3.12
OCT	43	.08	.02	43	7.12	3.75
NOV	26	.04	.01	26	5.70	3.75
DEC	31	.04	.02	31	5.85	2.00

SOUTHEAST DESERT AIR BASIN

VENTILATION FACTORS
(m^2/sec x 10^3)

	AM			PM		
	N	50%	10%	N	50%	10%
			THERMAL			
JAN	55	.13	.03	56	2.50	.23
FEB	51	.22	.04	50	4.86	1.83
MAR	58	.28	.06	57	5.99	1.27
APR	33	.40	.12	33	4.26	1.80
MAY	31	.27	.12	31	5.15	2.15
JUN	43	.29	.12	42	4.06	2.11
JUL	19	.43	.10	19	4.65	3.15
AUG	31	.37	.15	30	4.65	2.25
SEP	56	.20	.07	55	4.65	2.25
OCT	55	.18	.03	55	4.65	2.25
NOV	57	.12	.04	56	4.27	1.29
DEC	58	.08	.03	58	2.79	.90

SOUTH COAST AIR BASIN

VENTILATION FACTORS
($m^2/sec \times 10^3$)

	AM			PM		
	N	50%	10%	N	50%	10%
			EL MONTE			
JAN	19	.50	.10	18	3.90	1.28
FEB	10	.26	.11	9	1.69	1.00
MAR	--	--	--	--	----	----
APR	20	.29	.02	20	7.65	5.40
MAY	21	.41	.04	18	6.33	4.19
JUN	21	.29	.08	21	5.67	3.36
JUL	21	.29	.08	20	5.86	3.96
AUG	6	.35	.20	--	----	----
SEP	15	.15	.08	14	6.90	3.73
OCT	--	--	--	--	----	----
NOV	--	--	--	--	----	----
DEC	--	--	--	--	----	----
			LOS ANGELES (LAX)			
JAN	28	4.35	.21	20	5.77	3.68
FEB	26	1.00	.23	21	14.5	.99
MAR	31	2.63	.31	26	5.62	1.81
APR	12	1.43	.35	9	5.92	2.75
MAY	25	2.02	.17	25	4.49	2.19
JUN	30	.88	.19	24	2.76	1.64
JUL	31	1.07	.39	30	2.20	1.34
AUG	8	1.14	.66	7	2.51	1.72
SEP	30	.63	.22	17	1.81	.98
OCT	--	--	--	--	----	----
NOV	--	--	--	--	----	----
DEC	--	--	--	--	----	----

SOUTH COAST AIR BASIN

VENTILATION FACTORS
(m^2/sec x 10^3)

SAN BERNARDINO

	AM			PM		
	N	50%	10%	N	50%	10%
JAN	29	.10	.05	26	2.18	.51
FEB	36	.08	.02	34	2.25	.66
MAR	41	.16	.03	35	3.15	.79
APR	41	.07	.03	31	5.40	3.22
MAY	22	.79	.12	21	3.90	1.57
JUN	45	.11	.04	44	6.90	4.65
JUL	57	.10	.04	56	6.15	4.65
AUG	5	.21	.06	5	----	----
SEP	20	.04	.03	20	6.90	4.65
OCT	11	.09	.03	11	5.40	3.29
NOV	--	--	--	--	----	----
DEC	9	.12	.03	6	2.70	1.35

SOUTH COAST AIR BASIN

VENTILATION FACTORS
(m^2/sec x 10^3)

	AM N	AM 50%	AM 10%	PM N	PM 50%	PM 10%
SAN NICOLAS IS (9 m-msl)						
JAN	8	.90	.03	--	----	----
FEB	--	--	--	--	----	----
MAR	--	--	--	--	----	----
APR	7	2.47	.16	--	----	----
MAY	14	2.32	.28	13	4.17	1.73
JUN	10	3.93	1.61	7	4.26	3.23
JUL	12	2.11	.14	7	3.62	1.56
AUG	12	1.07	.11	10	2.28	1.36
SEP	--	--	--	--	----	----
OCT	6	1.26	.03	--	----	----
NOV	15	.29	.03	9	4.58	.62
DEC	11	.26	.06	7	7.46	1.34
SAN NICOLAS IS (170 m-msl)						
JAN	6	7.33	.02	--	----	----
FEB	--	----	--	--	----	----
MAR	--	----	--	--	----	----
APR	6	4.86	.02	--	----	----
MAY	13	1.61	.14	7	4.12	.93
JUN	14	1.68	.17	8	2.23	1.03
JUL	8	.88	.36	--	----	----
AUG	--	----	--	--	----	----
SEP	--	----	--	--	----	----
OCT	--	----	--	--	----	----
NOV	--	----	--	--	----	----
DEC	--	----	--	--	----	----

SAN DIEGO AIR BASIN

VENTILATION FACTORS
($m^2/sec \times 10^3$)

	AM			PM		
	N	50%	10%	N	50%	10%
			SAN DIEGO			
JAN	59	5.05	.17	59	5.10	4.21
FEB	23	.70	.27	22	5.10	1.39
MAR	41	5.85	1.45	39	7.05	3.99
APR	51	3.15	.56	50	9.41	1.68
MAY	60	3.17	1.04	62	4.92	1.69
JUN	19	2.76	.20	18	9.06	2.10
JUL	57	1.25	.68	57	2.38	1.36
AUG	61	1.33	.67	61	2.72	1.58
SEP	58	1.29	.39	58	2.74	1.26
OCT	17	.81	.09	16	4.37	1.16
NOV	57	.33	.04	53	5.40	1.27
DEC	59	.24	.03	56	5.10	.94

HOLZWORTH POTENTIAL (sec/m)

RED BLUFF

	AM					PM				
		10 km		100 km			10 km		100 km	
	N	50%	90%	50%	90%	N	50%	90%	50%	90%
Winter	32	25	73	197	676	32	13	25	53	175
Spring	89	16	31	95	258	89	10	11	15	25
Summer	131	16	31	104	245	131	9	11	14	16
Fall	133	22	57	162	469	133	10	15	21	72

SACRAMENTO

Winter	30	25	90	203	724	30	13	20	56	147
Spring	59	15	42	83	365	58	10	11	19	
Summer	110	16	43	93	395	110	9	11	19	30
Fall	137	21	73	155	673	136	10	15	27	65

TAHOE CITY

Winter	24	70	208	609	1663	26	11	15	36	79
Spring	--	--	--	--	--	--	--	--	--	--
Summer	--	--	--	--	--	--	--	--	--	--
Fall	--	--	--	--	--	--	--	--	--	--

HOLZWORTH POTENTIAL (sec/m)

UKIAH

	AM					PM				
		10 km		100 km			10 km		100 km	
	N	50%	90%	50%	90%	N	50%	90%	50%	90%
Winter	28	54	93	446	803	25	16	29	87	215
Spring	106	37	76	294	696	99	10	11	15	23
Summer	179	43	105	342	936	174	9	11	15	21
Fall	100	56	112	479	1024	94	10	21	24	147

OAKLAND

Winter	165	11	31	18	249	163	10	18	16	106
Spring	134	10	19	24	114	134	10	11	16	30
Summer	132	12	19	41	111	131	9	11	22	35
Fall	142	12	34	49	274	140	10	12	22	47

HOLZWORTH POTENTIAL (sec/m)

SALINAS

	AM					PM				
		10 km		100 km			10 km		100 km	
	N	50%	90%	50%	90%	N	50%	90%	50%	90%
Winter	90	14	24	73	181	90	10	14	25	57
Spring	143	12	25	47	193	143	9	11	15	22
Summer	153	13	30	53	228	153	9	11	20	29
Fall	104	15	40	77	354	104	10	11	20	36

FRESNO

Winter	105	23	65	158	546	105	12	19	46	120
Spring	143	16	31	92	245	143	9	11	14	[illegible]
Summer	139	18	31	116	245	139	9	11	14	1[illegible]
Fall	116	27	70	206	676	115	10	14	20	50

SAN DIEGO

Winter	141	13	100	65	949	137	10	11	14	43
Spring	154	10	16	19	83	151	10	11	15	34
Summer	137	12	16	45	89	136	10	11	27	42
Fall	132	14	83	65	765	127	10	11	22	46

HOLZWORTH POTENTIAL (sec/m)

VANDENBERG AFB

	AM					PM				
		10 km		100 km			10 km		100 km	
	N	50%	90%	50%	90%	N	50%	90%	50%	90%
Winter	76	11	53	29	548	76	10	17	15	94
Spring	106	10	17	15	106	103	10	13	15	54
Summer	113	13	32	54	251	113	10	14	30	64
Fall	103	16	74	93	662	103	10	16	31	98

PT. MUGU

Winter	111	38	254	314	2633	105	10	19	15	113
Spring	84	23	187	181	1683	81	10	15	23	64
Summer	118	36	148	300	1339	116	10	14	37	61
Fall	76	51	208	478	1762	74	11	17	28	100

SAN NICOLAS IS.

Winter	19	15	82	83	670	7	10	14	15	50
Spring	21	11	22	28	175	17	10	12	26	48
Summer	34	10	21	32	158	24	10	11	25	39
Fall	23	15	115	83	1305	14	10	14	20	56

HOLZWORTH POTENTIAL (sec/m)

CHINA LAKE

	AM					PM				
		10 km		100 km			10 km		100 km	
	N	50%	90%	50%	90%	N	50%	90%	50%	90%
Winter	26	16	111	64	1097	14	10	14	16	28
Spring	35	10	76	16	693	23	9	11	13	16
Summer	25	24	76	152	636	9	9	11	14	17
Fall	24	74	201	724	1783	4	9	11	16	21

EDWARDS AFB

Winter	94	30	281	228	2817	22	10	13	14	31
Spring	97	11	161	25	1486	26	10	13	14	19
Summer	92	20	150	141	1333	11	10	11	14	16
Fall	92	76	326	672	3104	9	10	14	15	23

THERMAL

Winter	165	45	142	395	1429	164	10	15	23	69
Spring	122	24	57	174	507	121	10	12	19	40
Summer	92	21	41	151	360	91	10	11	14	24
Fall	169	38	131	311	1277	166	10	11	14	29

HOLZWORTH POTENTIAL (sec/m)

LAX

	AM					PM				
		10 km		100 km			10 km		100 km	
	N	50%	90%	50%	90%	N	50%	90%	50%	90%
Winter	54	11	28	21	217	41	10	12	14	45
Spring	68	11	26	35	194	59	9	11	17	32
Summer	69	14	23	57	169	61	10	11	29	43
Fall	30	16	29	90	215	23	10	13	33	49

EL MONTE

Winter	29	19	54	124	461	27	10	14	15	43
Spring	41	21	87	145	989	38	9	11	15	20
Summer	48	24	62	161	568	44	9	11	17	22
Fall	15	35	60	284	483	14	9	11	15	21

SAN BERNARDINO

Winter	74	61	161	558	1510	66	11	18	22	95
Spring	104	40	149	322	1383	87	10	13	14	23
Summer	107	50	120	427	1210	105	9	11	13	16
Fall	31	97	165	939	1757	31	9	11	13	16